

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-153690

(43)Date of publication of application : 08.06.2001

(51)Int.Cl.

G01D 11/28  
G01D 13/28  
H01L 33/00

(21)Application number : 11-338574

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(22)Date of filing : 29.11.1999

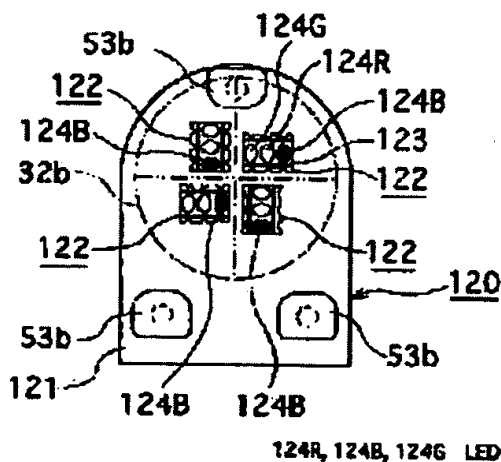
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## (54) POINTER LIGHTING SYSTEM FOR VEHICULAR METER

## (57)Abstract:

PROBLEM TO BE SOLVED: To improve the color mixing property in the illumination of a pointer by using a plurality of LEDs of different colors as light source and mixing the emitted colors thereof.

SOLUTION: LED units 122 are arranged within a first range and a third range so that they are substantially point symmetric to the end surface of the shaft part 32b of a pointer 32 when seen from the center of the end surface of the shaft part 32b, and the LEDs 124R, 124B, and 124G of every color of both the LED units 122 are arranged in the reversed order when seen from the center of the end surface of the shaft part 32b. Other LED units 122 are further arranged so that they are extended in the direction substantially orthogonal to both the LED units 122 arranged in the first and third ranges and substantially point symmetric when seen from the center of the end surface of the shaft part 32b, and the LEDs 124R, 124B and 124G of every color of both the LED units 122 are arranged in the reversed order when seen from the center of the end surface of the shaft part 32b.



## LEGAL STATUS

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**CLAIMS**

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**[Claim(s)]**

[Claim 1] In the guide lighting system of the meter for cars which introduces light into the interior of a guide from the end face of the revolving shaft of a guide, and illuminates the whole guide Use the light emitting diode unit which arranged two or more unique light emitting diodes in the shape of a straight line in predetermined sequence, and while countering the end face of said revolving shaft and arranging said two or more light emitting diode units in predetermined spacing to the hand of cut The guide lighting system of the meter for cars characterized by arranging said two or more light emitting diode units in physical relationship to which the light emitting diode of each color exists in the hand of cut of the end face of said revolving shaft uniformly [ abbreviation ].

[Claim 2] In the guide lighting system of the meter for cars which introduces light into the interior of a guide from the end face of the revolving shaft of a guide, and illuminates the whole guide When the light emitting diode unit which arranged two or more unique light emitting diodes in the shape of a straight line in predetermined sequence is used and the end face of the revolving shaft of said guide is equally divided into four at intervals of 90 degrees As opposed to said 1st range among the 1st range arranged in the hand of cut in order, the 2nd range, the 3rd range, and the 4th range, and the 3rd range While arranging so that said light emitting diode unit may be seen from the core of the end face of said revolving shaft and it may become abbreviation point symmetry, respectively The light emitting diode of each color of said both light emitting diode unit sees from the core of the end face of said revolving shaft, and arranges by the inverse ramp, and said the 2nd range and 4th range are received. While arranging so that it may extend in the direction which carries out an abbreviation rectangular cross with said both light emitting diode unit arranged in said 1st and 3rd range, and said light emitting diode unit may be seen from the core of the end face of said revolving shaft, respectively and it may become abbreviation point symmetry The guide lighting system of the meter for cars characterized by for the light emitting diode of each color of said both light emitting diode unit having seen from the core of the end face of said revolving shaft, and arranging in an inverse ramp.

[Claim 3] In the guide lighting system of the meter for cars which introduces light into the interior of a guide from the end face of the revolving shaft of a guide, and illuminates the whole guide When the light emitting diode unit which arranged two or more unique light emitting diodes in the shape of a straight line in predetermined sequence is used and trisection of the end face of the revolving shaft of said guide is carried out at intervals of 120 degrees Among the 1st range arranged in the hand of cut in order, the 2nd range, and the 3rd range, arrange said light emitting diode unit to said 1st range, and said the 2nd range and 3rd range are received. Said light emitting diode unit is arranged, respectively so that it may extend in the direction which intersects the light emitting diode unit arranged in said 1st range. The guide lighting system of the meter for cars characterized by the light emitting diode of each color looking at two light emitting diode units which adjoin at least among said light emitting diode units arranged in said the 1st thru/or 3rd range from the core of the end face of said revolving shaft, and making it stand in a line by the inverse ramp.

[Claim 4] In the guide lighting system of the meter for cars which introduces light into the interior of a

guide from the end face of the revolving shaft of a guide, and illuminates the whole guide. When the light emitting diode unit which arranged two or more unique light emitting diodes in the shape of a straight line in predetermined sequence is used and the end face of the revolving shaft of said guide is bisected at intervals of 180 degrees. While arranging so that it may become parallel mutually in the location which faces said light emitting diode unit to the 1st range and 2nd range which are arranged in the hand of cut in order, respectively. The guide lighting system of the meter for cars characterized by making it the light emitting diode of each color of said both light emitting diode unit located in a line by the inverse ramp.

[Claim 5] It is the guide lighting system of the meter for cars given in claim 1 which two or more light emitting diodes with said each unique light emitting diode unit consist of light emitting diode of blue, red, and each green color, and is characterized by said each light emitting diode unit coming to mount light emitting diode of blue [said], red, and each green color in the shape of a straight line in the sequence in the die-length direction of a rectangular plate-like base thru/or any 1 term of 4.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] About the guide lighting system of the meter for cars, especially this invention introduces light into the interior of a guide from the end face of the revolving shaft of a guide, and relates to the guide lighting system which illuminates the whole guide.

[0002]

[Description of the Prior Art] Conventionally, as a guide lighting system of the meter for cars, especially the meter for automobiles, there is the so-called edge light lighting system. This lighting system establishes the reflector which consists of a coloring coat in the rear face (underside) of the guide section while forming the guide section of a guide by the transparent material made of a transparent plastic. Moreover, opposite arrangement of the end of the photoconductive close member which becomes the perimeter of the revolving shaft of a guide from a transparent material is carried out, and opposite arrangement of the other end is carried out at the light source (mainly lamp bulb) for dial-face (especially alphabetic character and graduation part) lighting. And it concentrates on the revolving shaft of a guide by said photoconductive close member, and incidence of the light from the light source is carried out. Moreover, it reflects in the direction of a head of the guide section according to the reflector established in the front-face side (top-face side) of the revolving shaft of a guide, and scattered reflection of the incident light is carried out in the reflector of the coloring coat under the guide section. Thereby, the whole guide section of a guide can be illuminated with the luminescent color of said light source.

[0003] Moreover, distance from the light source to a photoconductive close member is shortened as much as possible, or the conventional edge light lighting system is raising profile irregularity of a photoconductive close member so that the incidence effectiveness of the light to a photoconductive close member and the reflective effectiveness by each reflector may be raised, in order to gather lighting effectiveness. Moreover, fluorescent paint with a reflection factor high as a coating of the reflector of the guide section may be used. Furthermore, when it arranges not only in one place but in the direction which faces and the guide is directing every graduation, he is trying for the light source to also illuminate a guide with fixed brightness, since a guide rotates.

[0004]

[Problem(s) to be Solved by the Invention] On the other hand, also in guide lighting systems, such as meter for automobiles, offering various lighting colors is called for with diversification of a user's hobby, taste, etc. in recent years. Here, in the above-mentioned edge light lighting system, it is possible by preparing two or more unique light sources, mixing two or more of the luminescent color suitably in addition to the luminescent color of itself, and obtaining the various luminescent color (mixed color) to enable it to choose the color of either of them suitably as a lighting color of a guide. However, if size of the number [ large \*\* and ] of arrangement increases, in order that the tooth space for it may increase and meter may enlarge the conventional lamp bulb, it is contrary to the request of thin-shape-izing for which meter in recent years is asked, and lightweight-izing.

[0005] then, this invention person etc. is small, and long lasting, and high-reliability in a low power -- etc. -- it examined using from a point the light emitting diode (only henceforth LED) which attracts attention as the light source for [ various ] lighting recently as the light source of this guide lighting

system. Moreover, since LED is less than a lamp bulb in respect of brightness and the quantity of light, it cannot obtain sufficient illuminance only by transposing the conventional lamp bulb to LED. Therefore, since this invention person etc. got uniform color mixture when a guide is illuminated with sufficient illuminance and color mixture of the unique LED light is carried out especially, he adds research to especially the arrangement mode of LED, and could make this invention as a result of much trial-and-error.

[0006] That is, two or more unique LED is used for this invention as the light source, and it makes a technical problem offer of the guide lighting system of the meter for cars which improved the color mixture nature in the case of mixing the luminescent color of these plurality and performing guide lighting.

[0007]

[Means for Solving the Problem] The guide lighting system of the meter for cars concerning claim 1 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, while countering the end face of said revolving shaft and arranging said two or more LED units in the hand of cut at intervals of predetermined, said two or more LED units are arranged by physical relationship to which LED of each color exists in the hand of cut of the end face of said revolving shaft uniformly [ abbreviation ].

[0008] Here, LED of each color tells it the physical relationship [ like ] LED of each color recognizes [ physical relationship ] abbreviation same number existence to each partition (that is, it does not concentrate on a specific partition), when it divided or divides and "physical relationship which exists uniformly [ abbreviation ]" looks at the end face of a revolving shaft to the hand of cut of the end face of a revolving shaft at intervals of a predetermined include angle at plurality. LED of the same color which carried out abbreviation same number arrangement sees and is not unevenly distributed in each partition from the whole end face of a revolving shaft simultaneously, and physical relationship which is uniformly arranged by the uniform consistency to the whole end face is said.

[0009] Therefore, if light is emitted in LED of an LED unit, from each of two or more LED units, the light of LED will carry out incidence to the range in which the end face of a revolving shaft corresponds, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0010] Since two or more LED units were arranged in the hand of cut of a revolving shaft at intervals of predetermined at this time, incidence of the light of each LED unit is uniformly carried out to the angular position of a revolving shaft into a guide not related. Moreover, since two or more LED units were arranged by physical relationship to which LED of each color exists in the hand of cut of the end face of a revolving shaft uniformly [ abbreviation ], the luminescent color of each LED is mixed uniformly.

[0011] The lighting system of the meter for cars concerning claim 2 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, when the end face of the revolving shaft of said guide is equally divided into four at intervals of 90 degrees, said the 1st range and 3rd range are received among the 1st range arranged in the hand of cut in order, the 2nd range, the 3rd range, and the 4th range. While arranging so that said LED unit may be seen from the core of the end face of said revolving shaft and it may become abbreviation point symmetry, LED of each color of said both LED unit sees from the core of the end face of said revolving shaft, and it is made to be located in a line by the inverse ramp, respectively. Furthermore, while arranging so that it may extend to said the 2nd range and 4th range in the direction which carries out an abbreviation rectangular cross with said both LED unit that arranged said LED unit in said 1st and 3rd range, respectively, and it may see from the core of the end face of said revolving shaft and it may become abbreviation point symmetry, LED of each color of said both LED unit sees from the core of the end face of said revolving shaft, and it is made to be located in a line by the inverse

ramp.

[0012] Therefore, in the guide lighting system of the meter for cars concerning claim 2, the end face of the revolving shaft of a guide is countered and four LED units are arranged. That is, each of the 1st range of the end face of a revolving shaft thru/or the 4th range is countered, and one LED unit each is arranged.

[0013] And if light is emitted in LED of an LED unit, from each of a total of four LED units, the light of LED will carry out incidence to the 1st thru/or the 4th range of the end face of a revolving shaft, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0014] At this time, four LED units are arranged in the hand of cut of a revolving shaft at intervals of 90 degrees. Moreover, the LED unit (a pair of 1st LED unit) of the couple arranged in the 1st range and 3rd range sees from the core of the end face of a revolving shaft, and serves as point symmetry. Similarly, the LED unit (a pair of 2nd LED unit) of other couples arranged in the 2nd range and 4th range sees from the core of the end face of a revolving shaft, and serves as point symmetry. Furthermore, said a pair of 1st LED unit and said a pair of 2nd LED unit are arranged so that it may extend in the direction which carries out an abbreviation rectangular cross. Thereby, when it divided or divides and the end face of a revolving shaft is seen to four at intervals of 90 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0015] Moreover, in a pair of 1st LED unit and a pair of 2nd LED unit which were arranged in the above modes, it is arranged in the shape of a straight line so that LED of each color may see from the core of the end face of a revolving shaft and may be located in a line by the inverse ramp, respectively. Namely, LED (for example, blue LED) of the 1st color of one LED unit between two LED units of each set If it is arranged in the core side of a revolving shaft and LED after the 2nd color (for example, red LED and green LED) is arranged toward a periphery side one by one from the core of a revolving shaft LED of the 1st color of the LED unit of another side is arranged in an opposite hand (periphery side) the core side of a revolving shaft, and LED after the 2nd color is arranged toward a core one by one from the periphery side of a revolving shaft.

[0016] Therefore, in the LED unit of each set, LED of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of a revolving shaft uniformly [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED mixes it uniformly while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft uniformly into a guide not related.

[0017] The lighting system of the meter for cars concerning claim 3 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, when trisection of the end face of the revolving shaft of said guide is carried out at intervals of 120 degrees, said LED unit is arranged to said 1st range among the 1st range arranged in the hand of cut in order, the 2nd range, and the 3rd range. Furthermore, it arranges so that it may extend to said the 2nd range and 3rd range in the direction which intersects the LED unit which arranged said LED unit in said 1st range, respectively. And LED of each color looks at two LED units which adjoin at least among said LED units arranged in said the 1st thru/or 3rd range from the core of the end face of said revolving shaft, and it is made to stand in a line by the inverse ramp.

[0018] Therefore, in the guide lighting system of the meter for cars concerning claim 3, the end face of the revolving shaft of a guide is countered and three LED units are arranged. That is, each of the 1st range of the end face of a revolving shaft thru/or the 3rd range is countered, and one LED unit each is arranged.

[0019] And if light is emitted in LED of an LED unit, from each of a total of three LED units, the light of LED will carry out incidence to the 1st thru/or the 3rd range of the end face of a revolving shaft, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED

of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0020] At this time, three LED units are arranged in the hand of cut of a revolving shaft at intervals of 120 degrees. Moreover, to the LED unit arranged in the 1st range, the LED unit of the couple arranged in the 2nd range and 3rd range is arranged so that it may extend in the crossing direction, respectively. Thereby, when it divided or divides and the end face of a revolving shaft is seen to three at intervals of 120 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0021] Moreover, in two LED units which adjoin at least among the 1st arranged in the above modes thru/or three LED units of the 3rd range, it is arranged in the shape of a straight line so that LED of each color may see from the core of the end face of a revolving shaft and may be located in a line by the inverse ramp, respectively. Namely, LED (for example, blue LED) of the 1st color of one LED unit between two adjoining LED units. If it is arranged in the core side of a revolving shaft and LED after the 2nd color (for example, red LED and green LED) is arranged toward a periphery side one by one from the core of a revolving shaft. LED of the 1st color of the LED unit of another side is arranged in an opposite hand (periphery side) the core side of a revolving shaft, and LED after the 2nd color is arranged toward a core one by one from the periphery side of a revolving shaft.

[0022] Therefore, in three LED units, LED of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of a revolving shaft uniformly [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED mixes it uniformly while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft uniformly into a guide not related.

[0023] The lighting system of the meter for cars concerning claim 4 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, while arranging said LED unit to the 1st range and 2nd range which are arranged in the hand of cut in order, respectively so that it may become parallel mutually in the location which faces when the end face of the revolving shaft of said guide is bisected at intervals of 180 degrees, it is made for LED of each color of said both LED unit to be located in a line by the inverse ramp.

[0024] Therefore, in the guide lighting system of the meter for cars concerning claim 4, the end face of the revolving shaft of a guide is countered and two LED units are arranged. That is, each of the 1st range of the end face of a revolving shaft and the 2nd range is countered, and one LED unit each is arranged.

[0025] And if light is emitted in LED of an LED unit, from each of a total of two LED units, the light of LED will carry out incidence to the 1st and 2nd range of the end face of a revolving shaft, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0026] At this time, two LED units are arranged in the hand of cut of a revolving shaft at intervals of 180 degrees. Moreover, it is arranged so that the LED unit arranged in the 1st range and the LED unit arranged in the 2nd range may become parallel mutually in the location which faces. Thereby, when it divided or divides and the end face of a revolving shaft is seen to two at intervals of 180 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0027] Moreover, in two LED units of the 1st and 2nd range arranged in the above modes, LED of each color is arranged in the shape of a straight line, respectively so that it may stand in a line by the inverse ramp. Namely, LED (for example, blue LED) of the 1st color of one LED unit is arranged in an upside between two adjoining LED units. If LED after the 2nd color (for example, red LED and green LED) is arranged toward the bottom one by one, LED of the 1st color of the LED unit of another side will be arranged in the bottom, and LED after the 2nd color will be arranged toward an upside one by one.

[0028] Therefore, in two LED units, LED of each color (same color) is arranged by physical relationship

which exists in the hand of cut of the end face of a revolving shaft uniformly [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED mixes it uniformly while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft uniformly into a guide not related.

[0029] In the configuration of claim 1 thru/or either of 4, the lighting system of the meter for cars concerning claim 5 constituted two or more LED with said each unique LED unit from LED of blue, red, and each green color, in the die-length direction of a rectangular plate-like base, mounted LED of blue [ said ], red, and each green color in the shape of a straight line in the sequence, and constituted said each LED unit.

[0030] Therefore, luminescence of each LED unit is attained in the color of the arbitration containing white by LED in three primary colors. Moreover, it mounts based on LED, and since the LED unit was constituted by unifying, the handling of an LED unit (arrangement, attachment, etc.) becomes easy. Therefore, each LED unit can be easily attached in a position.

[0031]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained. In addition, through the gestalt of each operation, identically the same to a corresponding member or a corresponding element or a corresponding reference mark is attached, and the overlapping explanation is omitted.

[0032] Drawing 1 is the front view showing the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention. Drawing 2 is the front view showing the reward plate of the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention. Drawing 3 is the side elevation showing the reward plate of the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[0033] As shown in drawing 1 , it is the gestalt 1 of operation. The guide lighting system of the meter for cars to cost is applied to meter for automobiles, such as a combined instrument. This meter for automobiles is equipped with the meter case made of non-transparence resin (graphic display abbreviation), and the reward plate 50 with which the front-face side of a meter case is equipped as shown in drawing 1 . The tachometer section 20 is formed in the left part within a meter case. The tachometer section 20 has a dial face 21 and a guide 22. The graduation and alphabetic character showing an engine speed are arranged in the periphery section of a dial face 21 at intervals of predetermined. Moreover, the speedometer section 30 is formed in the center section within a meter case. The speedometer section 30 has a dial face 31 and a guide 32. The graduation and alphabetic character showing the vehicle speed are arranged in the periphery section of a dial face 31 at intervals of predetermined. Furthermore, the fuel gage 40 and the water thermometer 45 are arranged in the right part within the meter case 10 as the auxiliary meter section. A fuel gage 40 has a dial face 41 and a guide 42. The graduation and alphabetic character showing remaining fuel are arranged in the periphery section of a dial face 41 at intervals of predetermined. Moreover, a water thermometer 45 has a dial face 46 and a guide 47. The graduation and alphabetic character showing a circulating water temperature are arranged in the periphery section of a dial face 46 at intervals of predetermined. In addition, said guides 22, 32, 42, and 47 have Shanks 22b, 32b, 42b, and 47b and the guide sections 22d, 32d, 42d, and 47d.

[0034] On the other hand, as shown in drawing 2 , the reward plate 50 has the plate-like mask section 51 for the shape of a case made of non-transparence resin in its nothing and back end side. The mask section 51 forms openings 52, 53, 54, and 55 in the location corresponding to said tachometer section 20, the speedometer 30 section, a fuel gage 40, and a water thermometer 45, respectively. And each dial faces 21, 31, 41, and 46 and guides 22, 32, 42, and 47 of the tachometer section 20, the speedometer 30 section, a fuel gage 40, and a water thermometer 45 are exposed from each openings 52, 53, 54, and 55. Furthermore, the shields 52A, 53A, 54A, and 55A which cover the shanks 22b, 32b, 42b, and 47b from the front (operator side) are really formed in the location corresponding to the shanks 22b, 32b, 42b, and 47b of said guides 22, 32, 42, and 47 among the openings 52, 53, and 54 of the mask section 51, and 55



peripheries.

[0035] The screw stop section 56 of a left Uichi pair is really formed in the upper bed edge by the side of the rear face of the reward plate 50 at predetermined spacing. The reward plate 50 is fixed to the circular hole which carried out penetration formation in the center of each screw stop section 56 at a meter case by inserting conclusion implements, such as a screw and a screw, and carrying out a screw stop to said meter case. In addition, at intervals of predetermined, as shown in drawing 3, it is really formed near the periphery edge by the side of the rear face of the reward plate 50 so that two or more hanging pawls 57 may project back (meter case side). That is, the hanging pawl 57 is really formed in two places, one center of the upper bed of the reward plate 50, and right and left, respectively.

Moreover, the hanging pawl 57 is really formed in two places, two centers of the soffit of the reward plate 50, and right and left, respectively. In addition, opening by the side of the front face of the reward plate 50 is equipped with a cover lens (graphic display abbreviation).

[0036] Next, the configuration of the dial-face lighting system for illuminating the dial faces 21, 31, 41, and 46 of the various meter sections 20, 30, 40, and 45 is explained. Drawing 4 is the rear view showing the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention with the structure by the side of the tooth back of the reward plate of the meter for automobiles.

[0037] The dial-face lighting system equips drawing 4 with the light guide rings 60, 70, 80, and 85, as a broken line shows. The light guide rings 60, 70, 80, and 85 really fabricate predetermined transparent materials, such as transparence acrylic resin, the shape of abbreviation horse's hoofs, and in the shape of radii, are formed, and are arranged corresponding to the tachometer section 20, the speedometer section 30, a fuel gage 40, and a water thermometer 45, respectively. That is, the light guide rings 60, 70, 80, and 85 are formed so that it may become a minor diameter from the openings 52, 53, 54, and 55 to which the bore corresponds a little. And as it is arranged and fixed along the openings 52 and 53 of the mask section 51, and a 54 or 55-round edge and is shown in drawing 1, the inner skin exposes the light guide rings 60, 70, 80, and 85 to the method of the inside of some from openings 52, 53, 54, and 55.

[0038] As shown in drawing 4, the both ends of the light guide ring 60 for tachometer section 20 and the light guide ring 70 for speedometer section 30 are equipped with the LED case 90, respectively. Moreover, one edge (upper bed section) of the light guide ring 80 for fuel gage 40 and the light guide ring 85 for water thermometer 45 is equipped with the LED case 90, respectively. The LED case 90 is formed in the rectangular-head tubed which carries out opening of the vertical ends from a resin ingredient. Adhesion maintenance of the LED case 90 is carried out at each edge of the light guide rings 60, 70, 80, and 85 by inserting the LED case 90 in each edge of the light guide rings 60, 70, 80, and 85 from a lower part.

[0039] LED (graphic display abbreviation) as the light source is held in the soffit section within said LED case 90, and the ends of the light guide rings 60, 70, 80, and 85 are equipped with LED through the LED case 90. Each LED is mounted in the flexible printed circuit board 100,105 mentioned later.

[0040] Next, gestalt 1 of operation of this invention The configuration of the guide lighting system of the meter for cars to cost is explained. Drawing 5 is X-X-ray sectional view of drawing 4, and shows the mounting condition of the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention. Drawing 6 R> 6 is the important section expanded sectional view of drawing 5.

[0041] The guide lighting system of the gestalt of this operation introduces light into guides 22, 32, and 42 and the 47 interior from the end face of revolving-shaft 32a which fixed in one to the shanks 22b, 32b, 42b, and 47b of the guides 22, 32, 42, and 47 of each meter sections 20, 30, 40, and 45, as shown in drawing 5 and drawing 6. Guides 22, 32, and 42 and the 47 whole are illuminated (only in the case of the speedometer section 30, it illustrates). First, a guide 32 will be equipped with 32d of guide sections really fabricated so that it might extend in the driving shaft for a guide revolution (graphic display abbreviation) in the radiation direction of revolving-shaft 32a by which actuation connection is carried out, shank 32b of the shape of a cylinder which really fixes pivotable at revolving-shaft 32a, and shank 32b if the configuration of guide 32 the very thing is explained. Said shank 32b and 32d of guide sections are really fabricated from predetermined transparent materials, such as transparence acrylic

resin. Moreover, reflector 32c which inclines in a rear-face side (dial-face 31 side) from a front-face side (shield 53A side) toward 32d of guide sections is formed in the interior of shank 32b. Furthermore, reflector 32e which consists of a white coating layer, an aluminum vacuum evaporatio layer, etc. is formed in the whole rear face of guide section 32a.

[0042] And if incidence of the light is carried out from the front face of shank 32b, the incident light will reflect by reflector 32c, will carry out incidence into 32d of guide sections, and will advance the inside of 32d of guide sections in the die-length direction. Moreover, it reflects by reflector 32e and the light which advanced the inside of 32d of guide sections is ahead emitted from the front face of 32d of guide sections. Thus, a guide 32 is illuminated.

[0043] The guide lighting system of the gestalt of this operation is equipped with the flexible printed circuit boards 100 and 105 of a couple, the LED subassembly 110 for tachometer section 20, the LED subassembly 120 for speedometer section 30, the LED subassembly 130 for fuel gage 40, and the LED subassembly 135 for water thermometer 45. As shown in drawing 4, said LED subassembly 110 is arranged in the rear face of shield 52A of the tachometer section 20 so that it may counter with shank 22b of a guide 22. The LED subassembly 120 is arranged in the rear face of shield 53A of the speedometer section 30 so that it may counter with shank 32b of a guide 32. The LED subassembly 130 is arranged in the rear face of shield 54A of a fuel gage 40 so that it may counter with shank 42b of a guide 42. The LED subassembly 135 is arranged in the rear face of shield 55A of a water thermometer 45 so that it may counter with shank 47b of a guide 47.

[0044] Said flexible printed circuit board 100 has the short band-like terminal area 101 and a connection 102. the leg prolonged, respectively in each LED subassembly 120,130,135 which the connection 102 arranged in the speedometer section 30, the fuel gage 40, and the water thermometer 45, and each LED case 90 of the light guide rings 70, 80, and 85 -- the shape of a polymelia sheet which has a part is made. Moreover, the flexible printed circuit board 105 has the short band-like terminal area 106 and a connection 107. the leg prolonged, respectively in the LED subassembly 110 which the connection 107 arranged in the tachometer section 20, and the LED case 90 of the light guide ring 60 -- the shape of a polymelia sheet which has a part is made.

[0045] Each flexible printed circuit board 100,105 is arranged in the mask section 51 and rear-face side of Shields 52A, 53A, 54A, and 55A, is covered, and is checked by looking from a transverse plane (operator side). Moreover, each flexible printed circuit board 100,105 is arranged in the rear face of the mask section 51 and Shields 52A, 53A, 54A, and 55A, and the space between dial faces 21, 31, 41, and 46, and contacts and interferes in dial faces 21, 31, 41, and 46.

[0046] Next, the mounting mode and its configuration to shield 53A of the LED subassembly 120 are explained in full detail. Drawing 7 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[0047] As shown in drawing 7, the LED subassembly 120 is equipped with the plate-like support base 121 which has an appearance corresponding to shield 53A, and four LED units 122 arranged in the front face (a dial-face 31 side or guide 32 side) of the support base 121 in the predetermined mode. The support base 121 is arranged so that it may lap with shield 53A and may be covered from a transverse-plane side (operator side) at the rear-face side of shield 53A. That is, as shown in drawing 6, while rib 53a is really formed in the rear face of shield 53A, a pillar-shaped projection is really formed in right and left of the center of the upper bed section, and the soffit section, respectively. On the other hand, a breakthrough is really formed in the location adjusted with said pillar-shaped projection, respectively at right and left of the center of the upper bed section of the support base 121, and the soffit section (graphic display abbreviation). And if each pillar-shaped projection 53b is inserted in each breakthrough of the support base 121 while laying the support base 121 in rib 53a of shield 53A, pillar-shaped projection 53b will carry out predetermined height projection from the rear face of the support base 121. This fixes the support base 121 to the rear-face side of shield 53A by carrying out the heat caulking of the point of pillar-shaped projection 53b. In addition, at this time, the support base 121 is thoroughly covered by shield 53A, and is not checked by looking from a transverse plane.

[0048] Said each LED unit 122 has two or more unique LED 124B, 124R, and 124G which carried out mounting arrangement in predetermined sequence on the unit base 123 and the unit base 123 at the shape of a straight line. That is, blue LED124B, red LED124R, and green LED124G are the sequence in nothing and its die-length direction about rectangular plate-like, and the unit base 123 is mounted so that predetermined spacing may be kept and it may stand in a line on a straight line. In addition, blue LED124B, red LED124R, and green LED124G consist of a chip LED. Moreover, the LED unit 122 constitutes the multicolor LED which can emit light freely in the color of the arbitration containing white by LED 124B, 124R, and 124G of these three primary colors.

[0049] In the gestalt of this operation the LED subassembly 120 for speedometer section 30 When the end face of shank 32b of the guide 32 used as the end face of revolving-shaft 32a of a guide 32 is equally divided into four at intervals of 90 degrees in the hand of cut (hoop direction) As opposed to said 1st range among the 1st range (upper right quadrant) arranged in the hand of cut in order, the 2nd range (lower right quadrant), the 3rd range (lower left quadrant), and the 4th range (upper left quadrant), and the 3rd range It is arranging so that the LED unit 122 may be seen from the core of the end face of said shank 32b and it may become abbreviation point symmetry, respectively. That is, the LED unit 122 is arranged in parallel near the core of the end face of shank 32b right above [ of the radius line (the two-dot chain line in drawing 7 shows) prolonged to the horizontal direction of the quadrant of the 1st range ]. Moreover, the LED unit 122 is arranged directly under the radius line prolonged to the horizontal direction of the quadrant of the 3rd range near the core of the end face of shank 32b at parallel. The LED unit 122 of the couple which this arranged so that the 1st and 3rd range might be countered is prolonged in the longitudinal direction in drawing 7 .

[0050] Furthermore, LED 124B, 124R, and 124G of each color of both the LED unit 122 sees from the core of the end face of shank 32b, and he is trying to locate it in a line by the inverse ramp. That is, in the LED unit 122 of the 1st range, LED 124B, 124R, and 124G of each color is seen from the core of the end face of shank 32b, and it is arranged so that it may rank with a longitudinal direction in green, red, and blue order. On the other hand, in the LED unit 122 of the 3rd range, LED 124B, 124R, and 124G of each color is seen from the core of the end face of shank 32b, and it is arranged so that it may rank with a longitudinal direction in blue, red, and green order.

[0051] Furthermore, it is arranging so that it may extend in the direction which carries out an abbreviation rectangular cross again to the 2nd range and 4th range of an end face of shank 32b with both the LED unit 122 that arranged the LED unit 122 in the 1st and 3rd range, respectively, and it may see from the core of the end face of shank 32b and it may become abbreviation point symmetry. That is, the LED unit 122 is arranged in parallel near the core of the end face of shank 32b at \*\*\*\* of the radius line prolonged to the perpendicular direction of the quadrant of the 2nd range. Moreover, the LED unit 122 is arranged in parallel near the core of the end face of shank 32b at \*\*\*\* of the radius line prolonged to the perpendicular direction of the quadrant of the 4th range. The LED unit 122 of the couple which this arranged so that the 2nd and 4th range might be countered is prolonged in the vertical direction in drawing 7 . Namely, it extends in the direction which intersects perpendicularly with the LED unit 122 of the couple arranged so that the 1st and 3rd range might be countered.

[0052] In addition, LED 124B, 124R, and 124G of each color of both the LED unit 122 sees from the core of the end face of shank 32b, and he is trying to locate it in a line by the inverse ramp. That is, in the LED unit 122 of the 2nd range, LED 124B, 124R, and 124G of each color is seen from the core of the end face of shank 32b, and it is arranged so that it may stand in a line in the vertical direction in green, red, and blue order. On the other hand, in the LED unit 122 of the 3rd range, LED 124B, 124R, and 124G of each color is seen from the core of the end face of shank 32b, and it is arranged so that it may stand in a line in the vertical direction in blue, red, and green order.

[0053] As mentioned above, with the gestalt of this operation, four LED units 122 are arranged the so-called shape of a wind mill, and in the shape of \*\*\*\*.

[0054] Drawing 8 is the top view showing the LED subassembly for the tachometer sections of the lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[0055] As shown in drawing 8 , the LED subassembly 110 is equipped with the plate-like support base

111 which has an appearance corresponding to shield 52A, and three LED units 112 arranged in the front face (a dial-face 21 side or guide 22 side) of the support base 111 in the predetermined mode. The support base 111 is arranged so that it may lap with shield 52A and may be covered from a transverse-plane side (operator side) at the rear-face side of shield 52A like the case of the LED subassembly 120 for the above-mentioned speedometer section 30. That is, while laying the support base 111 in the rib (graphic display abbreviation) of shield 52A, the support base 111 is fixed to the rear-face side of shield 52A by inserting each pillar-shaped projection 52b of shield 52A in each breakthrough (graphic display abbreviation) of the support base 111, and carrying out the heat caulking of the point of pillar-shaped projection 52b. In addition, at this time, the support base 111 is thoroughly covered by shield 52A, and is not checked by looking from a transverse plane.

[0056] Said each LED unit 112 has two or more unique LED 114B, 114R, and 114G which carried out mounting arrangement in predetermined sequence on the unit base 113 and the unit base 113 at the shape of a straight line. That is, blue LED114B, red LED114R, and green LED114G are the sequence in nothing and its die-length direction about rectangular plate-like, and the unit base 113 is mounted so that predetermined spacing may be kept and it may stand in a line on a straight line.

[0057] In the gestalt of this operation the LED subassembly 110 for tachometer section 20 When trisection of the end face of shank 22b as an end face of the revolving shaft of a guide 22 is carried out to the hand of cut (hoop direction) at intervals of 120 degrees The LED unit 112 is arranged to said 1st range among the 1st range (upper 3-minute circle) arranged in the hand of cut in order, the 2nd range (lower right 3-minute circle), and the 3rd range (lower left 3-minute circle). That is, near the core of the end face of shank 32b, the LED unit 112 is arranged in right above [ of the radius line (the two-dot chain line in drawing 8 shows) of the couple prolonged in the 45 slanting upper parts of a 3 minute circle of the 1st range / central ] so that it may extend in the longitudinal direction in drawing 8.

[0058] Moreover, it is arranging so that it may extend to the 2nd range and 3rd range in the direction which intersects the LED unit 112 which arranged the LED unit 112 in the 1st range, respectively. That is, the LED unit 112 is arranged in parallel near the core of the end face of shank 22b at \*\*\*\* of the radius line prolonged to the perpendicular direction of a 3-minute circle of the 2nd range. Moreover, the LED unit 112 is arranged in parallel near the core of the end face of shank 22b at \*\*\*\* of the radius line prolonged to the perpendicular direction of a 3-minute circle of the 3rd range. The LED unit 112 which this arranged so that the 2nd and 3rd range might be countered is prolonged in the vertical direction in drawing 8. Namely, it extends in the direction which intersects the LED unit 112 arranged so that the 1st range might be countered (rectangular cross).

[0059] In addition, with the gestalt of this operation, to the 1st range of the end face of shank 22b, the LED unit 112 is arranged so that it may extend in a longitudinal direction. Moreover, to the 2nd and 3rd range, the LED unit 112 is arranged in juxtaposition, respectively so that it may extend in the vertical direction in the location which faces parallel mutually. Therefore, the LED unit 112 of the 1st range and the LED unit 112 of the couple of the 2nd and 3rd range are arranged so that it may extend in the direction which intersects perpendicularly mutually.

[0060] Furthermore, LED 114B, 114R, and 114G of each color looks at two LED units 112 which adjoin at least among the LED units 112 arranged in the 1st thru/or the 3rd range from the core of the end face of shank 22b, and he is trying to stand in a line by the inverse ramp. That is, in the LED unit 112 of the 2nd range, LED 114B, 114R, and 114G of each color is seen from the core of the end face of shank 22b, and it is arranged so that it may stand in a line in the vertical direction in green, red, and blue order. On the other hand, in the LED unit 112 of the 3rd range, LED 114B, 114R, and 114G of each color is seen from the core of the end face of shank 22b, and it is arranged so that it may stand in a line in the vertical direction in blue, red, and green order. In addition, in the LED unit 112 of the 1st range, LED 114B, 114R, and 114G of each color is arranged so that it may rank with a longitudinal direction in green, red, and blue order from the left. Central red LED114R is arranged near the core of the end face of shank 22b.

[0061] Thus, LED 114B, 114R, and 114G of each color sees from the core of the end face of shank 22b, and he is trying to locate it in a line by the inverse ramp in the LED unit 112 of the 2nd range and the

3rd range in the LED subassembly 110 for tachometer section 20 of the gestalt of this operation.

[0062] Drawing 9 is the top view showing the LED subassembly for fuel gages of the lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[0063] As shown in drawing 9, the LED subassembly 130 is equipped with the plate-like support base 131 which has an appearance corresponding to shield 54A, and two LED units 132 arranged in the front face (a dial-face 41 side or guide 42 side) of the support base 131 in the predetermined mode. The support base 131 is arranged so that it may lap with shield 54A and may be covered from a transverse-plane side (operator side) at the rear-face side of shield 54A like the case of the LED subassembly 120 for the above-mentioned speedometer section 30. That is, while laying the support base 131 in the rib (graphic display abbreviation) of shield 54A, the support base 131 is fixed to the rear-face side of shield 54A by inserting each pillar-shaped projection 54b of shield 54A in each breakthrough (graphic display abbreviation) of the support base 131, and carrying out the heat caulking of the point of pillar-shaped projection 54b. In addition, at this time, the support base 131 is thoroughly covered by shield 54A, and is not checked by looking from a transverse plane.

[0064] Said each LED unit 132 has two or more unique LED 134B, 134R, and 134G which carried out mounting arrangement in predetermined sequence on the unit base 133 and the unit base 133 at the shape of a straight line. That is, blue LED134B, red LED134R, and green LED134G are the sequence in nothing and its die-length direction about rectangular plate-like, and the unit base 133 is mounted so that predetermined spacing may be kept and it may stand in a line on a straight line.

[0065] In the gestalt of this operation the LED subassembly 130 for fuel gage 40 as the auxiliary meter section When the end face of shank 42b as an end face of the revolving shaft of a guide 42 is bisected at intervals of 180 degrees to the hand of cut (hoop direction) To the 1st range (right-hand side bisection circle) and 2nd range (left-hand side bisection circle) which are arranged in the hand of cut in order, the LED unit 132 is arranged, respectively so that it may become parallel mutually in the location which faces. That is, in the bisection circle of the 1st range, the LED unit 132 is arranged in parallel near the core of the end face of shank 42b at central \*\*\*\* of the diameter line (the two-dot chain line in drawing 9 shows) prolonged in the vertical direction in drawing 9. Moreover, in the bisection circle of the 2nd range, the LED unit 132 is arranged in parallel near the core of the end face of shank 42b at central \*\*\*\* of the diameter line prolonged in the vertical direction.

[0066] In addition, with the gestalt of this operation, to the 1st range and 2nd range of an end face of shank 42b, it is arranging in juxtaposition in the location which faces the LED unit 132 so that it may extend in the vertical direction in parallel mutually. In addition, he is trying to locate in a line LED 134B, 134R, and 134G of each color of said LED unit 132 at a same order foreword. That is, in the LED unit 132 of the 1st and 2nd range, LED 134B, 134R, and 134G of each color is arranged [ both ] so that it may stand in a line in the vertical direction in green, red, and blue order from a top.

[0067] Here, although a graphic display is not carried out, the configuration of the LED subassembly 135 for water thermometer 45 is the same as the configuration of the LED subassembly 130 for fuel gage 40.

[0068] As mentioned above, the LED subassembly 110,120,130,135 of the fundamental configuration is the same although a number, an arrangement mode, etc. of the dimension of the support base and a configuration, and an LED unit differ from each other according to the class of the meter sections 20 and 30 which are the objects for lighting, or instruments 40 and 45, a dimension, etc. That is, the LED subassembly 110,120,130,135 is fixed to Shields 52A, 53A, 54A, and 55A by carrying out the heat caulking of the pillar-shaped projections 52b, 53b, and 54b of Shields 52A, 53A, 54A, and 55A, respectively. Moreover, the support base 111,121,131 of each LED subassembly 110,120,130,135 has the same configuration, and consists of a base which formed the predetermined circuit pattern for supplying electric power to LED 114B and 114R and 114G grade in the front-face side.

[0069] Furthermore, the LED unit 112,122,132 of each LED subassembly 110,120,130,135 is also the same configuration. That is, the unit base 113,123,133 of the LED unit 112,122,132 forms in a rear-face side the flow section through which it flows in the circuit pattern of the support base 111,121,131, when arrangement immobilization is carried out at the support base 111,121,131. Moreover, the same is said

of the configuration of LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G of each LED unit 112,122,132. That is, each LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G consists of a chip LED, is mounted in the unit base 111,123,133, and is electrically connected with the support base 111,121,131.

[0070] Furthermore, with the gestalt of this operation, the \*\*\*\* point of the connection 102 of the flexible printed circuit board 100 was joined to the front-face side of the support base 121,131 of the LED subassembly 120,130,135, and it has connected with the circuit pattern and the electric target of the support base 121,131. And by control of the luminescence control circuit which is not illustrated, through the flexible printed circuit board 100 and the support base 121,131, a current is supplied to the LED unit 122,132 in a predetermined control mode, and light is emitted in the luminescent color and the luminescence mode of a request of LED 124B, 124R, 124G, 134B, 134R, and 134G of each color. By this, incidence of the light of LED 124B, 124R, 124G, 134B, 134R, and 134G is carried out from the end face of the shanks 32b, 42b, and 47b of guides 32, 42, and 47, light is emitted in said luminescent color and a luminescence mode in guides 32 and 42 and the 47 whole, and guides 32, 42, and 47 are illuminated.

[0071] Similarly, the \*\*\*\* point of the connection 102 of the flexible printed circuit board 100 is connected to LED and the electric target within the LED case 90 while being joined to the LED case 90 of the light guide rings 70, 80, and 85 fixed to the reward plate 50. And by control of said luminescence control circuit, through the flexible printed circuit board 100, a current is supplied to LED within the LED case 90 in a predetermined control mode, and light is emitted in the luminescent color and the luminescence mode of a request of the LED. By this, incidence of the light of LED within the LED case 90 is carried out from the end face of the light guide rings 70, 80, and 85, light is emitted in said luminescent color and a luminescence mode in the light guide rings 70 and 80 and the 85 whole, and dial faces 31, 41, and 46 are illuminated.

[0072] On the other hand, it joined to the front-face side of the support base 111 of the LED subassembly 110, and the \*\*\*\* point of the connection 107 of the flexible printed circuit board 105 is connected to the circuit pattern and the electric target of the support base 111. And by control of said luminescence control circuit, through the flexible printed circuit board 105 and the support base 111, a current is supplied to the LED unit 112 in a predetermined control mode, and light is emitted in the luminescent color and the luminescence mode of a request of LED 114B, 114R, and 114G of each color. By this, incidence of the light of LED 114B, 114R, and 114G is carried out from the end face of shank 22b of a guide 22, light is emitted in said luminescent color and a luminescence mode in the guide 22 whole, and a guide 22 is illuminated.

[0073] Similarly, the \*\*\*\* point of the connection 107 of the flexible printed circuit board 105 is connected to LED and the electric target within the LED case 90 while being joined to the LED case 90 of the light guide ring 60 fixed to the reward plate 50. And by control of said luminescence control circuit, through the flexible printed circuit board 105, a current is supplied to LED within the LED case 90 in a predetermined control mode, and light is emitted in the luminescent color and the luminescence mode of a request of the LED. By this, incidence of the light of LED within the LED case 90 is carried out from the end face of the light guide ring 60, light is emitted in said luminescent color and a luminescence mode in the light guide ring 60 whole, and a dial face 21 is illuminated.

[0074] In addition, with the gestalt of this operation, the actuation tongue 141 which looked at the control action by said luminescence control circuit from the transverse-plane side of the reward plate 50, and arranged it in the right edge is made to perform. That is, when a user does revolution actuation of the actuation tongue 141 suitably, a current is supplied to the terminal area 101,106 of the flexible printed circuit board 100,105 by control of a luminescence control circuit in a predetermined control mode from a power source, and light can be emitted in the desired luminescent color and a desired luminescence mode in LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G for guide lighting, and LED for dial-face lighting.

[0075] Next, the operation of the guide lighting system of the meter for cars and effectiveness concerning the gestalt 1 of the operation constituted as mentioned above are explained.

[0076] In the guide lighting system of the meter for cars concerning the gestalt of this operation When the lighting of meter is required and users, such as an operator, do revolution actuation of the actuation tongue 141 at night etc., by control of a luminescence control circuit The flexible printed circuit boards 100 and 105 are minded. Luminescence actuation of LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G of the LED unit 112,122,132,137 of each LED subassembly 110,120,130,135 is carried out. Then, the light of LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G carries out an abbreviation rectangular cross, and carries out incidence to the end face of the shanks 22b, 32b, 42b, and 47b of each corresponding guides 22, 32, 42, and 47. Then, it reflects by reflector 32c in Shanks 22b, 32b, and 42b and 47b, and the incident light spreads the inside of the guide sections 22, 32, and 42 and 47 in the die-length direction. And it reflects by reflector 32e of the guide sections 22, 32, 42, and 47, and outgoing radiation of the light is carried out from the front face of the guide sections 22, 32, 42, and 47. Thus, guides 22, 32, and 42 and the 47 whole are illuminated by the predetermined luminescent color emitted from LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G, and the light of a luminescence mode.

[0077] while making the LED unit 112,122,132,137 into the multicolor LED which has LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G in three primary colors with the gestalt of this operation at this time -- a luminescence control circuit -- the actuation tongue 141 -- minding -- a color change -- it can write that it is controllable and light can be freely emitted by the color of a request of the LED unit 112,122,132,137. Therefore, the luminescent color of the LED unit 112,122,132,137 can be changed if needed, and each guides 22, 32, 42, and 47 of the meter for automobiles can be illuminated by the desired color. Consequently, the design nature in the guide lighting of the meter for automobiles can be diversified, and the variegated illumination effectiveness can be demonstrated. In addition, each LED unit 112,122,132,137 usually emits light with the color mixture of LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G of two colors or three colors, although monochrome luminescence by one color in three primary colors is also possible.

[0078] Moreover, in the above-mentioned lighting actuation, with the guide 32 of the speedometer section 30, the end face of shank 32b of a guide 32 is countered, and four LED units 122 are arranged. That is, each of the 1st range of the end face of shank 32b thru/or the 4th range is countered, and one LED unit 122 each is arranged.

[0079] And if light is emitted in LED 124B, 124R, and 124G of the LED unit 122, from each of a total of four LED units 122, the light of LED 124B, 124R, and 124G will carry out incidence to the 1st thru/or the 4th range of the end face of shank 32b, respectively, will spread in the guide 32 whole, and will illuminate the guide 32 whole. Moreover, from LED 124B, 124R, and 124G of each LED unit 122, since incidence of the unique light is carried out, a guide 32 is usually illuminated by the light of those color mixture.

[0080] At this time, four LED units 122 are arranged in the hand of cut of shank 32b at intervals of 90 degrees. Moreover, the LED unit (a pair of 1st LED unit) 122 of the couple arranged in the 1st range and 3rd range sees from the core of the end face of shank 32b, and serves as point symmetry. Similarly, the LED unit (a pair of 2nd LED unit) 122 of other couples arranged in the 2nd range and 4th range sees from the core of the end face of shank 32b, and serves as point symmetry. Furthermore, a pair of 1st LED unit 122 and a pair of 2nd LED unit 122 are arranged so that it may extend in the direction which carries out an abbreviation rectangular cross. Thereby, when it divided or divides and the end face of shank 32b is seen to four at intervals of 90 degrees, LED 124B, 124R, and 124G of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0081] Moreover, in a pair of 1st LED unit 122 and a pair of 2nd LED unit 122 which were arranged in the above modes, it is arranged in the shape of a straight line so that LED 124B, 124R, and 124G of each color may see from the core of the end face of shank 32b and may be located in a line by the inverse ramp, respectively. Namely, LED of the 1st color of one [ among two LED units 122 of each set ] LED unit 122, For example, if blue LED122B is arranged in the core side of shank 32b and LED after the 2nd color, for example, red LED124R, and green LED124G are arranged toward a periphery



side one by one from the core of shank 32b Blue LED122B of the LED unit 122 of another side is arranged in an opposite hand (periphery side) the core side of shank 32b, and red LED122R and green LED122G are arranged toward a core one by one from the periphery side of shank 32b.

[0082] Therefore, in the LED unit 122 of each set, LED 124B, 124R, and 124G of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of shank 32b uniformly [ abbreviation ]. Thereby, LED 124B, 124R, and 124G of each color is arranged in the hand of cut of the end face of shank 32b by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED 124B, 124R, and 124G mixes it uniformly while carrying out incidence of the light of each LED unit 122 uniformly into a guide 32 regardless of the angular position of shank 32b. Consequently, the guide 32 whole can be uniformly illuminated with uniform color mixture.

[0083] On the other hand, with the guide 22 of the tachometer section 20, the end face of shank 22b of a guide 22 is countered, and three LED units 112 are arranged. That is, each of the 1st range of the end face of shank 22b thru/or the 3rd range is countered, and one LED unit 112 each is arranged.

[0084] And if light is emitted in LED 114B, 114R, and 114G of the LED unit 112, from each of a total of three LED units 112, the light of LED 114B, 114R, and 114G will carry out incidence to the 1st thru/or the 3rd range of the end face of shank 22b, respectively, will spread in the guide 22 whole, and will illuminate the guide 22 whole. Moreover, from LED 114B, 114R, and 114G of each LED unit 112, since incidence of the unique light is carried out, a guide 22 is usually illuminated by the light of those color mixture.

[0085] At this time, three LED units 112 are arranged in the hand of cut of shank 22b at intervals of 120 degrees. Moreover, to the LED unit 112 arranged in the 1st range, the LED unit 112 of the couple arranged in the 2nd range and 3rd range is arranged so that it may extend in the direction crossing (rectangular cross), respectively. Thereby, when it divided or divides and the end face of shank 22b is seen to three at intervals of 120 degrees, LED 114B, 114R, and 114G of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0086] Moreover, in two LED units 112 which adjoin at least among the 1st arranged in the above modes thru/or three LED units 112 of the 3rd range, it is arranged in the shape of a straight line so that LED 114B, 114R, and 114G of each color may see from the core of the end face of shank 22b and may be located in a line by the inverse ramp, respectively. Namely, LED of the 1st color of one [ among two adjoining LED units 112 ] LED unit 112, For example, if blue LED114B is arranged in the core side of shank 22b and LED after the 2nd color, for example, red LED114R, and green LED114G are arranged toward a periphery side one by one from the core of shank 22b Blue LED114B of the LED unit 112 of another side is arranged in an opposite hand (periphery side) the core side of shank 22b, and red LED114R and green LED114G are arranged toward a core one by one from the periphery side of shank 22b.

[0087] Therefore, in three LED units 112, LED 114B, 114R, and 114G of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of shank 22b uniformly [ abbreviation ]. Thereby, LED 114B, 114R, and 114G of each color is arranged in the hand of cut of the end face of shank 22b by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED 114B, 114R, and 114G mixes it uniformly while carrying out incidence of the light of each LED unit 112 uniformly into a guide 22 regardless of the angular position of shank 22b. Consequently, the guide 22 whole can be uniformly illuminated with uniform color mixture.

[0088] Furthermore, with the guide 42 of a fuel gage 40, the end face of shank 42b of a guide 42 is countered, and two LED units 132 are arranged. That is, each of the 1st range of the end face of a shank 132 and the 2nd range is countered, and one LED unit 132 each is arranged.

[0089] And if light is emitted in LED 134B, 134R, and 134G of the LED unit 132, from each of a total of two LED units 132, the light of LED 134B, 134R, and 134G will carry out incidence to the 1st and 2nd range of the end face of shank 42b, respectively, will spread in the guide 42 whole, and will illuminate the guide 42 whole. Moreover, from LED 134B, 134R, and 134G of each LED unit 132, since incidence of the unique light is carried out, a guide 42 is usually illuminated by the light of those



color mixture.

[0090] At this time, two LED units 132 are arranged in the hand of cut of shank 42b at intervals of 180 degrees. Moreover, it is arranged so that the LED unit 132 arranged in the 1st range and the LED unit 132 arranged in the 2nd range may become parallel mutually in the location which faces. Thereby, when it divided or divides and the end face of shank 42b is seen to two at intervals of 180 degrees, LED 134B, 134R, and 134G of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0091] Therefore, in two LED units 132, LED 134B, 134R, and 134G of each color (same color) is arranged by physical relationship which exists in the same number in the hand of cut of the end face of a revolving shaft. And while carrying out incidence to the angular position of shank 42b into a guide regardless of the light of tales doses from each LED unit 132, the light of the tales doses from each LED 134B, 134R, and 134G carries out color mixture. Consequently, the guide 42 whole can be uniformly illuminated with uniform color mixture.

[0092] Furthermore, in the gestalt of this operation, luminescence of each LED unit 112,122,132,137 is attained in the color of the arbitration containing white again by LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G in three primary colors. Moreover, since the LED unit 112,122,132,137 was constituted by mounting LED 114B, 114R, 114G, 124B, 124R, 124G, 134B, 134R, and 134G in the unit base 113,123,133, and unifying, the handling of the LED unit 112,122,132,137 (arrangement, attachment, etc.) becomes easy. Therefore, each LED unit 112,122,132,137 can be easily attached in the position of the LED subassembly 110,120,130,135.

[0093] In addition, lighting actuation of the light guide rings 60, 70, 80, and 85 is also performed to lighting actuation and coincidence of the above-mentioned guides 22, 32, 42, and 47, and lighting of dial faces 21, 31, 41, and 46 is performed to them.

[0094] Drawing 10 is the rear view showing the guide lighting system of the meter for cars concerning the gestalt 2 of operation of this invention. Drawing 11 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 2 of operation of this invention.

[0095] The guide lighting system of the meter for cars concerning the gestalt 2 of operation corresponds to the configuration by the side of the flexible printed circuit board 100 in the guide lighting system of the gestalt 1 of operation, and as shown in drawing 10, it is materialized by the guide lighting system which illuminates the guide 32 of the speedometer section 30 of the meter for automobiles, the guide 42 of a fuel gage 40, and the guide 47 of a water thermometer 45. The guide lighting system of the meter for cars concerning the gestalt 2 of operation is equipped with the flexible printed circuit board 200, the LED subassembly 210 for speedometer section 30, the LED subassembly 240 for fuel gage 40, and the LED subassembly 245 for water thermometer 45. The configuration of the flexible printed circuit board 200 and each LED subassembly 210,240,245 is the same as the configuration of the flexible printed circuit board 100 of the gestalt 1 of operation, and each LED subassembly 120,130,135 almost, and is similarly arranged in a predetermined location.

[0096] That is, like the gestalt 1 of operation, the LED subassembly 210 is arranged so that the rear face of shield 53A of the speedometer section 30 may be countered with shank 32b of a guide 32. Moreover, the LED subassembly 240 is arranged in the rear face of shield 54A of a fuel gage 40 so that it may counter with shank 42b of a guide 42. Furthermore, the LED subassembly 245 is arranged in the rear face of shield 55A of a water thermometer 45 so that it may counter with shank 47b of a guide 47. furthermore, the leg to which said flexible printed circuit board 200 has the short band-like terminal area 201 and a connection 202, and a connection 202 extends again, respectively in each LED subassembly 210,240,245 and each LED case 90 of the light guide rings 70, 80, and 85 -- the shape of a polymelia sheet which has a part is made.

[0097] On the other hand, as shown in drawing 11, although the LED subassembly 210 is the almost same configuration as the LED subassembly 120 of the gestalt 1 of operation, the arrangement mode of the LED unit 212 differs from the arrangement mode of the LED unit 122 of the gestalt 1 of operation. That is, with the gestalt 2 of operation, four LED units 212 are arranged to four LED units 122 being

arranged with the gestalt 1 of operation the so-called shape of a wind mill, and in the shape of \*\*\*\* the shape of the shape of a wind mill, and \*\*\*\* of the gestalt 1 of operation, and an opposite direction.

[0098] The LED subassembly 210 equips a detail with the support base 121, the same support base 211 of a configuration, and the LED unit 122 and the LED unit 212 of the same configuration. Moreover, the breakthrough 215 and the breakthrough 216 are really formed in the location adjusted with pillar-shaped projection 53b of said shield 53A, respectively at right and left of the center of the upper bed section of the support base 211, and the soffit section, respectively. And if each pillar-shaped projection 53b is inserted in each breakthrough 215,216 of the support base 211 while laying the support base 211 in rib 53a of shield 53A, pillar-shaped projection 53b will carry out predetermined height projection from the rear face of the support base 211. This fixes the support base 211 to the rear-face side of shield 53A by carrying out the heat caulking of the point of pillar-shaped projection 53b.

[0099] Each [ LED unit 212 / itself ] is the same configuration as the LED unit 122, and it has blue LED214B mounted so that predetermined spacing might be kept in the die-length direction of the unit base 213 and the unit base 213 and it might stand in a line on a straight line, red LED214R, and green LED214G. On the other hand, in the gestalt of this operation, it is the arrangement mode of reverse in four LED units 122 of the gestalt 1 of operation, and four LED units 212 are arranged so that it may see from the core of the end face of said shank 32b and may become abbreviation point symmetry. That is, the LED unit 212 is arranged in parallel near the core of the end face of shank 32b at \*\*\*\* of the radius line prolonged to the perpendicular direction of \*\*\*\* of the radius line prolonged to the perpendicular direction of the quadrant of the 1st range, and the quadrant of the 3rd range, respectively. A pair of 1st LED unit 212 which this arranged so that the 1st and 3rd range might be countered is prolonged in the vertical direction in drawing 11 . Furthermore, the LED unit 212 is arranged in parallel near the core of the end face of shank 32b right above [ of the radius line prolonged to directly under / of the radius line prolonged to the horizontal direction of the quadrant of the 2nd range /, and the horizontal direction of the quadrant of the 4th range ], respectively. A pair of 2nd LED unit 212 which this arranged so that the 2nd and 4th range might be countered is prolonged in the longitudinal direction in drawing 11 .

[0100] LED 214B, 214R, and 214G of each color looks at the LED unit 212 of each set from the core of the end face of shank 32b like the gestalt 1 of operation, and he is trying to stand in a line by the inverse ramp. That is, in the LED unit 212 of the 1st range, blue, red, and green LED 214B, 214R, and 214G see from the core of the end face of shank 32b, and they are arranged so that it may stand in a line in the vertical direction in the order. On the other hand, in the LED unit 212 of the 3rd range, green, red, and blue LED 214B, 214R, and 214G see from the core of the end face of shank 32b, and they are arranged so that it may stand in a line in the vertical direction in the order. On the other hand, in the LED unit 212 of the 2nd range, blue, red, and green LED 214B, 214R, and 214G see from the core of the end face of shank 32b, and they are arranged so that it may rank with a longitudinal direction in the order. On the other hand, in the LED unit 212 of the 4th range, green, red, and blue LED 214B, 214R, and 214G see from the core of the end face of shank 32b, and they are arranged so that it may rank with a longitudinal direction in the order.

[0101] Moreover, the LED subassembly 240 is the same configuration as the LED subassembly 130 of the gestalt 1 of operation, and has the same unit base 241 and two same LED units 242. The LED subassembly 245 is the same configuration as the LED subassembly 135 of the gestalt 1 of operation, and has the same unit base 246 and two same LED units 247.

[0102] Furthermore, with the gestalt 2 of operation, the LED subassembly 220,230 and the LED unit 251,252 are formed corresponding to the LED case 90 of each light guide rings 70, 80, and 85. That is, corresponding to the LED case 90 of light guide ring 70 ends, opposite arrangement of the LED subassemblies 220 and 230 is carried out, respectively. The LED subassembly 220 has the support base 221 and two LED units 222 arranged in juxtaposition. The LED subassembly 230 has the support base 231 and the LED unit 232. Moreover, corresponding to the LED case 90 of the end (upper bed) of the light guide ring 80, opposite arrangement of the LED unit 251 is carried out, and opposite arrangement of the LED unit 252 is carried out corresponding to the LED case 90 of the end (upper bed) of the light guide ring 85.

[0103] The support base 221,231 of each LED subassembly 220,230 has the same configuration, and consists of a base which formed the predetermined circuit pattern for supplying electric power to LED of the LED unit 222,232 in three primary colors in the front-face side. Moreover, the LED unit 222,232,251,252 is also the same configuration as each above-mentioned LED unit 212 grade, and arranges blue, red, and green LED on a straight line on a unit base in the order. And the support base 221,231 of the LED subassembly 220,230 arranged in the \*\*\*\* point of the connection 202 of the flexible printed circuit board 200 and the LED unit 251,252 is joined to the LED case 90 of the light guide rings 70, 80, and 85 fixed to the reward plate 50.

[0104] At this time, LED of each LED unit 222,232,251,252 is arranged in said each LED case 90. And by control of said luminescence control circuit, through the flexible printed circuit board 200, a current is supplied to each LED of the LED unit 222,232,251,252 within the LED case 90 in a predetermined control mode, and light is emitted in the luminescent color and the luminescence mode of a request of each LED unit 222,232,251,252. By this, incidence of the light of the LED unit 222,232,251,252 within the LED case 90 is carried out from the end face of the light guide rings 70, 80, and 85, light is emitted in said luminescent color and a luminescence mode in the light guide rings 70 and 80 and the 85 whole, and dial faces 31, 41, and 46 are illuminated.

[0105] The guide lighting system of the meter for cars concerning the gestalt 2 of the operation constituted as mentioned above acts like the guide lighting system of the meter for cars concerning the gestalt 1 of operation, and demonstrates the same effectiveness. Furthermore, since the LED subassembly 220,230 for dial-face lighting was unified in addition to the LED subassembly 210,240,245 for guide lighting, shape can be taken as a lighting system which can illuminate the whole (a dial face and guide) meter for cars, and it has effectiveness, like the handling (attachment activity etc.) becomes easy.

[0106] Next, example of another of each meter sections 20 and 30 and each instrument 40, and the LED subassembly for 45 is explained.

[0107] Drawing 12 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 3 of operation of this invention.

[0108] Although the LED subassembly 300 for speedometer section 30 of the gestalt 3 of operation is the almost same configuration as the LED subassembly 120 of the gestalt 1 of operation, the arrangement mode of the LED unit 302 differs from the arrangement mode of the LED unit 122 of the gestalt 1 of operation. That is, with the gestalt 3 of operation, four LED units 302 are arranged the shape of the shape of a wind mill, and a cross joint of a four-sheet wing, as shown in drawing 12.

[0109] The LED subassembly 300 equips a detail with the support base 121, the same support base 301 of a configuration, and the LED unit 122 and the LED unit 302 of the same configuration. Moreover, each [ LED unit 302 / itself ] is the same configuration as the LED unit 122, and it has blue LED304B mounted so that predetermined spacing might be kept in the die-length direction of the unit base 303 and the unit base 303 and it might stand in a line on a straight line, red LED304R, and green LED304G. It is arranging so that it may become the shape of a cross joint which looks at four LED units 302 from the core of the end face of said shank 32b, and is prolonged in the radiation direction in the gestalt of this operation on the other hand. That is, near the core of the end face of shank 32b, the LED unit 302 is arranged in the center of both the radii line of the quadrant of the 1st range, and the center between both the radii lines of the quadrant of the 3rd range at point symmetry, respectively so that it may extend in the radiation direction. Furthermore, near the core of the end face of shank 32b, the LED unit 302 is arranged in the center of both the radii line of the quadrant of the 2nd range, and the center of both the radii line of the quadrant of the 4th range at point symmetry, respectively so that it may extend in the radiation direction. LED 304B, 304R, and 304G of each color looks at the LED unit 302 of each set from the core of the end face of shank 32b like the gestalt 1 of operation, and he is trying to stand in a line by the inverse ramp.

[0110] The LED subassembly 300 of the guide lighting system concerning the gestalt 3 of the operation constituted as mentioned above acts like the LED subassembly 120 of the guide lighting system concerning the gestalt 1 of operation, and demonstrates the same effectiveness.

[0111] Drawing 13 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 4 of operation of this invention.

[0112] The LED subassembly 310 for speedometer section 30 of the gestalt 4 of operation is the almost same configuration as the LED subassembly 120 of the gestalt 1 of operation, and is arranging four LED units 312 the shape of the same shape of a wind mill as the LED unit 122, and \*\*\*\* of a gestalt 1 of operation. On the other hand, with the gestalt 4 of operation, as shown in drawing 13, the arrangement mode of LED 314B, 314R, and 314G of four LED units 312 differs from the gestalt 1 of operation.

[0113] The LED subassembly 310 equips a detail with the support base 121, the same support base 311 of a configuration, and the LED unit 122 and the LED unit 312 of the same configuration. Moreover, each [ LED unit 312 / itself ] is the same configuration as the LED unit 122, and it has blue LED314B mounted so that predetermined spacing might be kept in the die-length direction of the unit base 313 and the unit base 313 and it might stand in a line on a straight line, red LED314R, and green LED314G. He is the LED unit 312 of each set, and is trying to, locate in a line LED 314B, 314R, and 314G of each color in order of the case of the gestalt 1 of operation, and reverse in the gestalt of this operation on the other hand. That is, in the LED unit 312 of the 1st range, blue, red, and green LED 314B, 314R, and 314G see from the core of the end face of shank 32b, and they are arranged so that it may rank with a longitudinal direction in the order. On the other hand, in the LED unit 312 of the 3rd range, green, red, and blue LED 314B, 314R, and 314G see from the core of the end face of shank 32b, and they are arranged so that it may rank with a longitudinal direction in the order. On the other hand, in the LED unit 312 of the 2nd range, blue, red, and green LED 314B, 314R, and 314G see from the core of the end face of shank 32b, and they are arranged so that it may stand in a line in the vertical direction in the order. On the other hand, in the LED unit 312 of the 4th range, green, red, and blue LED 314B, 314R, and 314G see from the core of the end face of shank 32b, and they are arranged so that it may stand in a line in the vertical direction in the order.

[0114] The LED subassembly 310 of the guide lighting system concerning the gestalt 4 of the operation constituted as mentioned above acts like the LED subassembly 120 of the guide lighting system concerning the gestalt 1 of operation, and demonstrates the same effectiveness.

[0115] Drawing 14 is the top view showing the LED subassembly for the tachometer sections of the lighting system of the meter for cars concerning the gestalt 5 of operation of this invention.

[0116] As shown in drawing 14, although the LED subassembly 320 is the almost same configuration as the LED subassembly 110 of the gestalt 1 of operation, the arrangement mode of the LED unit 322 differs from the arrangement mode of the LED unit 112 of the gestalt 1 of operation. That is, with the gestalt 5 of operation, three LED units 322 are arranged in the shape of [ which made reverse physical relationship of three LED units 112 of the gestalt 1 of operation, and upper and lower sides ] an abbreviation wind mill.

[0117] The LED subassembly 320 equips a detail with the support base 111, the same support base 321 of a configuration, and the LED unit 112 and the LED unit 322 of the same configuration. Moreover, the breakthrough 325 is really formed in the location adjusted with the pillar-shaped projection of said shield 52A, respectively at right and left of the upper bed left part of the support base 321, and the soffit section, respectively. And while laying the support base 321 in the rib of shield 52A, the support base 321 is fixed to the rear-face side of shield 52A by inserting each pillar-shaped projection in each breakthrough 325 of the support base 321, and carrying out the heat caulking of the point of a pillar-shaped projection.

[0118] Each [ LED unit 322 / itself ] is the same configuration as the LED unit 112, and it has blue LED324B mounted so that predetermined spacing might be kept in the die-length direction of the unit base 323 and the unit base 323 and it might stand in a line on a straight line, red LED324R, and green LED324G. On the other hand, in the gestalt of this operation, it is near the core of the end face of shank 22b, and the LED unit 322 is arranged in parallel at \*\*\*\* of the radius line prolonged to \*\*\*\* of the radius line prolonged to the perpendicular direction of the 1st range (upper right 3-minute circle), and the perpendicular direction of the 3rd range (upper left 3-minute circle), respectively. The LED unit 322 of the couple which this arranged so that the 1st and 3rd range might be countered is prolonged in the

vertical direction in drawing 14 . the core of the end face of shank 22b near [ furthermore, ] -- directly under [ of both the radii line of the 3-minute circle of the 2nd range / central ] -- the LED unit 322 -- longitudinal-direction \*\*\*\*\* in drawing 14 -- it needs -- it is arranging. The LED unit 322 which this arranged so that the 1st and 3rd range might be countered is prolonged in the direction which intersects the LED unit 322 arranged in the 2nd range (rectangular cross).

[0119] Furthermore, in the LED unit 322 of the 1st range, green, red, and blue LED 324G, 324R, and 324B see from the core of the end face of shank 22b, and they are arranged so that it may stand in a line in the vertical direction in the order. On the other hand, in the LED unit 322 of the 3rd range, blue, red, and green LED 324B, 324R, and 324G see from the core of the end face of shank 22b, and they are arranged so that it may stand in a line in the vertical direction in the order. In addition, in the LED unit 322 of the 2nd range, while green, red, and blue LED 324G, 324R, and 324B are arranged so that it may stand in a line in the order from the left, central red LED324R is arranged near the core of the end face of shank 22b.

[0120] Thus, LED 324B, 324R, and 324G of each color sees from the core of the end face of shank 22b, and he is trying to locate it in a line by the inverse ramp in the LED unit 322 of the 1st range and the 3rd range in the LED subassembly 320 for tachometer section 20 of the gestalt of this operation.

[0121] The LED subassembly 320 of the guide lighting system concerning the gestalt 5 of the operation constituted as mentioned above acts like the LED subassembly 110 of the guide lighting system concerning the gestalt 1 of operation, and demonstrates the same effectiveness.

[0122] Drawing 15 is the top view showing the LED subassembly for the tachometer sections of the lighting system of the meter for cars concerning the gestalt 6 of operation of this invention.

[0123] As shown in drawing 15 , although the LED subassembly 330 is the almost same configuration as the LED subassembly 110 of the gestalt 1 of operation, the arrangement mode of the LED unit 332 differs from the arrangement mode of the LED unit 112 of the gestalt 1 of operation. That is, with the gestalt 6 of operation, three LED units 332 are arranged in the shape of [ of a three sheet wing ] a wind mill.

[0124] The LED subassembly 330 equips a detail with the support base 111, the same support base 331 of a configuration, and the LED unit 112 and the LED unit 332 of the same configuration. Each [ LED unit 332 / itself ] is the same configuration as the LED unit 112, and it has blue LED334B mounted so that predetermined spacing might be kept in the die-length direction of the unit base 333 and the unit base 333 and it might stand in a line on a straight line, red LED334R, and green LED334G.

[0125] It is arranging so that three LED units 332 may be seen from the core of the end face of said shank 22b and it may extend in the radiation direction in the gestalt of this operation on the other hand. That is, near the core of the end face of shank 22b, the LED unit 332 is arranged in the center of both the radii line of the 1st thru/or the 3-minute circle of the 3rd range so that it may extend in the radiation direction. Thereby, three LED units 332 arranged in the 1st thru/or the 3rd range are prolonged in the direction which crosses mutually. LED 334B, 334R, and 334G of each color looks at the LED unit 332 of the 1st and 2nd range, or the LED unit 332 of the 1st and 3rd range from the core of the end face of shank 22b, and he is trying to locate it in a line by the inverse ramp.

[0126] The LED subassembly 330 of the guide lighting system concerning the gestalt 6 of the operation constituted as mentioned above acts like the LED subassembly 110 of the guide lighting system concerning the gestalt 1 of operation, and demonstrates the same effectiveness.

[0127] Drawing 16 is the top view showing the LED subassembly for fuel gages of the lighting system of the meter for cars concerning the gestalt 7 of operation of this invention.

[0128] As shown in drawing 16 , although the LED subassembly 340 is the almost same configuration as the LED subassembly 130 of the gestalt 1 of operation, the arrangement sequence of LED 344B, 344R, and 344G of the LED unit 342 differs from the arrangement sequence of LED 132B, 132R, and 132G of the LED unit 132 of the gestalt 1 of operation. The LED subassembly 340 equips a detail with the support base 131, the same support base 341 of a configuration, and the LED unit 132 and the LED unit 342 of the same configuration. Each [ LED unit 342 / itself ] is the same configuration as the LED unit 132, and it has blue LED344B mounted so that predetermined spacing might be kept in the die-

length direction of the unit base 343 and the unit base 343 and it might stand in a line on a straight line, red LED344R, and green LED344G.

[0129] Two LED units 342 are made for LED 344B, 344R, and 344G of each color to be located in a line in the vertical direction in drawing 16 by the inverse ramp in the gestalt of this operation on the other hand. That is, by the LED unit 342 of the 1st range, while blue, red, and green LED 344B, 344R, and 344G are located in a line in the order from a top, with the LED unit 342 of the 2nd range, green, red, and blue LED 344G, 344R, and 344B are located in a line in the order from a top.

[0130] The LED subassembly 340 of the guide lighting system concerning the gestalt 7 of the operation constituted as mentioned above acts like the LED subassembly 130 of the guide lighting system concerning the gestalt 1 of operation, and demonstrates the same effectiveness.

[0131] by the way, this invention -- three LED units were arranged in the guides 22 of the tachometer section 20, and two LED units were arranged in the guides 32 of the speedometer section 30 for four LED units, respectively the guide 42 of the other auxiliary meter sections (a fuel gage 40, water thermometer 45 grade), and for 47. However, the guide lighting system of this invention can set up suitably the arrangement number and the arrangement mode of an LED unit in consideration of the meter section for lighting or the dimension of the guide of an instrument, a required illuminance, etc. That is, it is so desirable that the diameter of the shank of the guide used as the incidence end face of LED light becomes large to increase the number of an LED unit and to increase the illuminance of a guide. Usually, like a speedometer, when the diameter of a revolving shaft is large, four LED units are arranged. Moreover, a diameter arranges two pieces or three LED units in what is whenever [ middle ] like a tachometer. Furthermore, two LED units are arranged in what has a small diameter like a fuel gage and a water thermometer.

[0132] Moreover, while countering the end face of the revolving shaft (shank) of a guide and arranging two or more LED units in the hand of cut at intervals of predetermined as an arrangement mode of an LED unit As long as two or more LED units are arranged by physical relationship to which LED of each color exists in the hand of cut of the end face of a revolving shaft uniformly [ abbreviation ], the arrangement mode of arbitration besides arrangement modes, such as the shape of the shape of the shape of an abbreviation wind mill like the gestalt of the above-mentioned implementation and \*\*\*\* and a cross joint, can be used. In addition, LED of each color tells it the physical relationship [ like ] LED of each color recognizes [ physical relationship ] abbreviation same number existence to each partition (that is, it does not concentrate on a specific partition), when it divided or divides and "physical relationship which exists uniformly [ abbreviation ]" looks at the end face of a revolving shaft to the hand of cut of the end face of a revolving shaft at intervals of a predetermined include angle at plurality. LED of the same color which carried out abbreviation same number arrangement sees and is not unevenly distributed in each partition from the whole end face of a revolving shaft simultaneously, and physical relationship which is uniformly arranged by the uniform consistency to the whole end face is said. For example, LED of the same color which carries out same number arrangement is seen from the core of the end face of a revolving shaft in each range like the gestalten 3 or 4 of operation, it arranges in the position of symmetry, or physical relationship which looks at from the diameter line of the end face of a revolving shaft, arranges in the position of symmetry (axial symmetry), or is carried out is said like (point symmetry) or the gestalt 7 of operation.

[0133] Moreover, although the shank of the shape of a cylinder of a major diameter was fixed in one at the head of the revolving shaft of a minor diameter, it was made to carry out incidence of the light of an LED unit to the end face of a shank and the configuration of an end face was made circular with the gestalt of each above-mentioned implementation, a revolving shaft or a shank is made into configurations other than a cylinder, and it is good also considering an end face as a configuration except circular.

[0134] In addition, the LED unit of the gestalt of each above-mentioned implementation arranges LED in three primary colors in a unit base in the shape of a straight line according to every one-piece each individual, and unifies (unitization). However, although it unites with the "LED unit" said by this invention thoroughly in such a form, it considers as one unit (one unit), only combining others and

unique LED, and the case where two or more units (unit) are mounted in the support base or flexible printed circuit board of an LED subassembly so that the revolving shaft or shank end face of a guide may be countered is included. However, like the gestalt of the above-mentioned implementation, if two or more unique LED is arranged in a unit base in order of the same arrangement and each LED unit is united with it, LED of each color can be arranged in the same sequence by arranging such an LED unit in the same direction, or LED of each color can be arranged by the inverse ramp by arranging in hard flow, and the physical relationship of LED of each color can be set up easily.

[0135] Furthermore, although it made the number of LED of each color of each LED unit into one piece at a time, it is also possible to carry out at a time to two or more pieces. Moreover, although LED of each LED unit considered as a combination in three primary colors, it can also be made into the combination of colors other than this. For example, considering as the combination of LED of two colors, or considering as the combination of LED of colors other than the above also by three colors etc. can be considered as the LED unit of other combination.

[0136]

[Effect of the Invention] Since the guide lighting system of the meter for cars concerning claim 1 was constituted as mentioned above, it carries out incidence of the light of each LED unit to the angular position of a revolving shaft uniformly into a guide not related. Moreover, the luminescent color of each LED is mixed uniformly. Consequently, the whole guide can be uniformly illuminated with uniform color mixture.

[0137] Since the lighting system of the meter for cars concerning claim 2 was constituted as mentioned above, when it divided or divides and the end face of a revolving shaft is seen to four at intervals of 90 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition). Moreover, in a pair of 1st LED unit and a pair of 2nd LED unit which were arranged in the above modes, it is arranged in the shape of a straight line so that LED of each color may see from the core of the end face of a revolving shaft and may be located in a line by the inverse ramp, respectively. Therefore, in the LED unit of each set, LED of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of a revolving shaft uniformly [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED mixes it uniformly while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft uniformly into a guide not related. Consequently, the whole guide can be uniformly illuminated with uniform color mixture.

[0138] Since the lighting system of the meter for cars concerning claim 3 was constituted as mentioned above, when it divided or divides and the end face of a revolving shaft is seen to three at intervals of 120 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition). Moreover, in two LED units which adjoin at least among the 1st arranged in the above modes thru/or three LED units of the 3rd range, it is arranged in the shape of a straight line so that LED of each color may see from the core of the end face of a revolving shaft and may be located in a line by the inverse ramp, respectively. Therefore, in three LED units, LED of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of a revolving shaft uniformly [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED mixes it uniformly while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft uniformly into a guide not related. Consequently, the whole guide can be uniformly illuminated with uniform color mixture.

[0139] Since the lighting system of the meter for cars concerning claim 4 was constituted as mentioned above, when it divided or divides and the end face of a revolving shaft is seen to two at intervals of 180 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition). Moreover, in two LED units of the 1st and 2nd range arranged in the above modes, LED of each color is arranged in the shape of a straight line, respectively so that it may stand in a line by the inverse ramp. Thereby, LED of each color is arranged in the hand of cut of the end

face of a revolving shaft by "physical relationship which exists uniformly [ abbreviation ]." And the luminescent color of each LED mixes it uniformly while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft uniformly into a guide not related. Consequently, the whole guide can be uniformly illuminated with uniform color mixture.

[0140] Since the lighting system of the meter for cars concerning claim 5 was constituted as mentioned above, in addition to the effectiveness of claim 1 thru/or either of 4, luminescence of each LED unit is attained in the color of the arbitration containing white by LED in three primary colors. Moreover, it mounts based on LED, and since the LED unit was constituted by unifying, the handling of an LED unit (arrangement, attachment, etc.) becomes easy. Therefore, each LED unit can be easily attached in a position



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**TECHNICAL FIELD**

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[Field of the Invention] About the guide lighting system of the meter for cars, especially this invention introduces light into the interior of a guide from the end face of the revolving shaft of a guide, and relates to the guide lighting system which illuminates the whole guide.

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[Translation done.]

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**MEANS**

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[Means for Solving the Problem] The guide lighting system of the meter for cars concerning claim 1 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, while countering the end face of said revolving shaft and arranging said two or more LED units in the hand of cut at intervals of predetermined, said two or more LED units are arranged by physical relationship to which LED of each color exists in the hand of cut of the end face of said revolving shaft equally [ abbreviation ].

[0008] Here, LED of each color tells it the physical relationship [ like ] LED of each color recognizes [ physical relationship ] abbreviation same number existence to each partition (that is, it does not concentrate on a specific partition), when it divided or divides and "physical relationship which exists equally [ abbreviation ]" looks at the end face of a revolving shaft to the hand of cut of the end face of a revolving shaft at intervals of a predetermined include angle at plurality. LED of the same color which carried out abbreviation same number arrangement sees and is not unevenly distributed in each partition from the whole end face of a revolving shaft at coincidence, and physical relationship which is uniformly arranged by the uniform consistency to the whole end face is said.

[0009] Therefore, if light is emitted in LED of an LED unit, from each of two or more LED units, the light of LED will carry out incidence to the range in which the end face of a revolving shaft corresponds, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0010] Since two or more LED units were arranged in the hand of cut of a revolving shaft at intervals of predetermined at this time, incidence of the light of each LED unit is uniformly carried out to the angular position of a revolving shaft equally into a guide not related. Moreover, since two or more LED units were arranged by physical relationship to which LED of each color exists in the hand of cut of the end face of a revolving shaft equally [ abbreviation ], the luminescent color of each LED is mixed equally.

[0011] The lighting system of the meter for cars concerning claim 2 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, when the end face of the revolving shaft of said guide is equally divided into four at intervals of 90 degrees, said the 1st range and 3rd range are received among the 1st range arranged in the hand of cut in order, the 2nd range, the 3rd range, and the 4th range. While arranging so that said LED unit may be seen from the core of the end face of said revolving shaft and it may become abbreviation point symmetry, LED of each color of said both LED unit sees from the core of the end face of said revolving shaft, and it is made to be located in a line by the inverse ramp, respectively. Furthermore, while arranging so that it may extend to said the 2nd range and 4th range in the direction which carries out an abbreviation rectangular cross with said both LED unit that arranged said LED unit in said 1st and 3rd range, respectively, and it may see from the core of the end face of said revolving

shaft and it may become abbreviation point symmetry, LED of each color of said both LED unit sees from the core of the end face of said revolving shaft, and it is made to be located in a line by the inverse ramp.

[0012] Therefore, in the guide lighting system of the meter for cars concerning claim 2, the end face of the revolving shaft of a guide is countered and four LED units are arranged. That is, each of the 1st range of the end face of a revolving shaft thru/or the 4th range is countered, and one LED unit each is arranged.

[0013] And if light is emitted in LED of an LED unit, from each of a total of four LED units, the light of LED will carry out incidence to the 1st thru/or the 4th range of the end face of a revolving shaft, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0014] At this time, four LED units are arranged in the hand of cut of a revolving shaft at intervals of 90 degrees. Moreover, the LED unit (a pair of 1st LED unit) of the pair arranged in the 1st range and 3rd range sees from the core of the end face of a revolving shaft, and serves as point symmetry. Similarly, the LED unit (a pair of 2nd LED unit) of other pairs arranged in the 2nd range and 4th range sees from the core of the end face of a revolving shaft, and serves as point symmetry. Furthermore, said a pair of 1st LED unit and said a pair of 2nd LED unit are arranged so that it may extend in the direction which carries out an abbreviation rectangular cross. Thereby, when it divided or divides and the end face of a revolving shaft is seen to four at intervals of 90 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0015] Moreover, in a pair of 1st LED unit and a pair of 2nd LED unit which were arranged in the above modes, it is arranged in the shape of a straight line so that LED of each color may see from the core of the end face of a revolving shaft and may be located in a line by the inverse ramp, respectively. Namely, LED (for example, blue LED) of the 1st color of one LED unit between two LED units of each set If it is arranged in the core side of a revolving shaft and LED after the 2nd color (for example, red LED and green LED) is arranged toward a periphery side one by one from the core of a revolving shaft LED of the 1st color of the LED unit of another side is arranged in the opposite side (periphery side) the core side of a revolving shaft, and LED after the 2nd color is arranged toward a core one by one from the periphery side of a revolving shaft.

[0016] Therefore, in the LED unit of each set, LED of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of a revolving shaft equally [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists equally [ abbreviation ]." And the luminescent color of each LED mixes it equally while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft equally uniformly into a guide not related.

[0017] The lighting system of the meter for cars concerning claim 3 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, when trisection of the end face of the revolving shaft of said guide is carried out at intervals of 120 degrees, said LED unit is arranged to said 1st range among the 1st range arranged in the hand of cut in order, the 2nd range, and the 3rd range. Furthermore, it arranges so that it may extend to said the 2nd range and 3rd range in the direction which intersects the LED unit which arranged said LED unit in said 1st range, respectively. And LED of each color looks at two LED units which adjoin at least among said LED units arranged in said the 1st thru/or 3rd range from the core of the end face of said revolving shaft, and it is made to stand in a line by the inverse ramp.

[0018] Therefore, in the guide lighting system of the meter for cars concerning claim 3, the end face of the revolving shaft of a guide is countered and three LED units are arranged. That is, each of the 1st range of the end face of a revolving shaft thru/or the 3rd range is countered, and one LED unit each is arranged.

[0019] And if light is emitted in LED of an LED unit, from each of a total of three LED units, the light

of LED will carry out incidence to the 1st thru/or the 3rd range of the end face of a revolving shaft, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0020] At this time, three LED units are arranged in the hand of cut of a revolving shaft at intervals of 120 degrees. Moreover, to the LED unit arranged in the 1st range, the LED unit of the pair arranged in the 2nd range and 3rd range is arranged so that it may extend in the crossing direction, respectively. Thereby, when it divided or divides and the end face of a revolving shaft is seen to three at intervals of 120 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0021] Moreover, in two LED units which adjoin at least among the 1st arranged in the above modes thru/or three LED units of the 3rd range, it is arranged in the shape of a straight line so that LED of each color may see from the core of the end face of a revolving shaft and may be located in a line by the inverse ramp, respectively. Namely, LED (for example, blue LED) of the 1st color of one LED unit between two adjoining LED units. If it is arranged in the core side of a revolving shaft and LED after the 2nd color (for example, red LED and green LED) is arranged toward a periphery side one by one from the core of a revolving shaft LED of the 1st color of the LED unit of another side is arranged in the opposite side (periphery side) the core side of a revolving shaft, and LED after the 2nd color is arranged toward a core one by one from the periphery side of a revolving shaft.

[0022] Therefore, in three LED units, LED of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of a revolving shaft equally [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists equally [ abbreviation ]." And the luminescent color of each LED mixes it equally while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft equally uniformly into a guide not related.

[0023] The lighting system of the meter for cars concerning claim 4 introduces light into the interior of a guide from the end face of the revolving shaft of a guide, illuminates the whole guide, and the LED unit which arranged two or more unique LED in the shape of a straight line in predetermined sequence is used for it. Moreover, while arranging said LED unit to the 1st range and 2nd range which are arranged in the hand of cut in order, respectively so that it may become parallel mutually in the location which faces when the end face of the revolving shaft of said guide is bisected at intervals of 180 degrees, it is made for LED of each color of said both LED unit to be located in a line by the inverse ramp.

[0024] Therefore, in the guide lighting system of the meter for cars concerning claim 4, the end face of the revolving shaft of a guide is countered and two LED units are arranged. That is, each of the 1st range of the end face of a revolving shaft and the 2nd range is countered, and one LED unit each is arranged.

[0025] And if light is emitted in LED of an LED unit, from each of a total of two LED units, the light of LED will carry out incidence to the 1st and 2nd range of the end face of a revolving shaft, respectively, will spread to the whole guide, and will illuminate the whole guide. Moreover, from LED of each LED unit, since incidence of the unique light is carried out, a guide is usually illuminated by the light of those color mixture.

[0026] At this time, two LED units are arranged in the hand of cut of a revolving shaft at intervals of 180 degrees. Moreover, the LED unit arranged in the 1st range and the LED unit arranged in the 2nd range are arranged so that it may become parallel mutually in the location which faces. Thereby, when it divided or divides and the end face of a revolving shaft is seen to two at intervals of 180 degrees, LED of each color recognizes same number existence to each partition range (that is, it does not concentrate on a specific partition).

[0027] Moreover, in two LED units of the 1st and 2nd range arranged in the above modes, LED of each color is arranged in the shape of a straight line, respectively so that it may stand in a line by the inverse ramp. Namely, LED (for example, blue LED) of the 1st color of one LED unit is arranged in the bottom between two adjoining LED units. If LED after the 2nd color (for example, red LED and green LED) is arranged toward the bottom one by one, LED of the 1st color of the LED unit of another side will be

arranged in the bottom, and LED after the 2nd color will be arranged toward a top one by one.

[0028] Therefore, in two LED units, LED of each color (same color) is arranged by physical relationship which exists in the hand of cut of the end face of a revolving shaft equally [ abbreviation ]. Thereby, LED of each color is arranged in the hand of cut of the end face of a revolving shaft by "physical relationship which exists equally [ abbreviation ]." And the luminescent color of each LED mixes it equally while carrying out incidence of the light of each LED unit to the angular position of a revolving shaft equally uniformly into a guide not related.

[0029] In the configuration of claim 1 thru/or either of 4, the lighting system of the meter for cars concerning claim 5 constituted two or more LED with said each unique LED unit from LED of blue, red, and each green color, in the die-length direction of a rectangular plate-like base, mounted LED of blue [ said ], red, and each green color in the shape of a straight line in the sequence, and constituted said each LED unit.

[0030] Therefore, luminescence of each LED unit is attained in the color of the arbitration containing white by LED in three primary colors. Moreover, it mounts based on LED, and since the LED unit was constituted by unifying, the handling of an LED unit (arrangement, attachment, etc.) becomes easy. Therefore, each LED unit can be easily attached in a position.

[0031]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained. In addition, through the gestalt of each operation, identically the same to a corresponding member or a corresponding element or a corresponding reference mark is attached, and the overlapping explanation is omitted.

[0032] Drawing 1 is the front view showing the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention. Drawing 2 is the front view showing the reward plate of the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention. Drawing 3 is the side elevation showing the reward plate of the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[0033] As shown in drawing 1, it is the gestalt 1 of operation. The guide lighting system of the meter for cars to cost is applied to meter for automobiles, such as a combined instrument. This meter for automobiles is equipped with the meter case made of non-transparence resin (illustration abbreviation), and the reward plate 50 with which the front-face side of a meter case is equipped as shown in drawing 1. The tachometer section 20 is formed in the left part within a meter case. The tachometer section 20 has a dial face 21 and a guide 22. The graduation and alphabetic character showing an engine speed are arranged in the periphery section of a dial face 21 at intervals of predetermined. Moreover, the speedometer section 30 is formed in the center section within a meter case. The speedometer section 30 has a dial face 31 and a guide 32. The graduation and alphabetic character showing the vehicle speed are arranged in the periphery section of a dial face 31 at intervals of predetermined. Furthermore, the fuel gage 40 and the water thermometer 45 are arranged in the right part within the meter case 10 as the auxiliary meter section. A fuel gage 40 has a dial face 41 and a guide 42. The graduation and alphabetic character showing remaining fuel are arranged in the periphery section of a dial face 41 at intervals of predetermined. Moreover, a water thermometer 45 has a dial face 46 and a guide 47. The graduation and alphabetic character showing a circulating water temperature are arranged in the periphery section of a dial face 46 at intervals of predetermined. In addition, said guides 22, 32, 42, and 47 have Shanks 22b, 32b, 42b, and 47b and the guide sections 22d, 32d, 42d, and 47d.

[0034] On the other hand, as shown in drawing 2, the reward plate 50 has the plate-like mask section 51 for the shape of a case made of non-transparence resin in its nothing and back end side. The mask section 51 forms openings 52, 53, 54, and 55 in the location corresponding to said tachometer section 20, the speedometer 30 section, a fuel gage 40, and a water thermometer 45, respectively. And each dial faces 21, 31, 41, and 46 and guides 22, 32, 42, and 47 of the tachometer section 20, the speedometer 30 section, a fuel gage 40, and a water thermometer 45 are exposed from each openings 52, 53, 54, and 55. Furthermore, the shields 52A, 53A, 54A, and 55A which cover the shanks 22b, 32b, 42b, and 47b from

the front (operator side) are really formed in the location corresponding to the shanks 22b, 32b, 42b, and 47b of said guides 22, 32, 42, and 47 among the openings 52, 53, and 54 of the mask section 51, and 55 peripheries.

[0035] The screw stop section 56 of a right-and-left pair is really formed in the upper limit edge by the side of the rear face of the reward plate 50 at intervals of predetermined. The reward plate 50 is fixed to the circular hole which carried out penetration formation in the center of each screw stop section 56 at a meter case by inserting conclusion implements, such as a screw and a screw, and carrying out a screw stop to said meter case. In addition, at intervals of predetermined, as shown in drawing 3, it is really formed near the periphery edge by the side of the rear face of the reward plate 50 so that two or more hanging pawls 57 may project back (meter case side). That is, the hanging pawl 57 is really formed in two places, one center of the upper limit of the reward plate 50, and right and left, respectively. Moreover, the hanging pawl 57 is really formed in two places, two centers of the lower limit of the reward plate 50, and right and left, respectively. In addition, opening by the side of the front face of the reward plate 50 is equipped with a cover lens (illustration abbreviation).

[0036] Next, the configuration of the dial-face lighting system for illuminating the dial faces 21, 31, 41, and 46 of the various meter sections 20, 30, 40, and 45 is explained. Drawing 4 is the rear view showing the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention with the structure by the side of the tooth back of the reward plate of the meter for automobiles.

[0037] The dial-face lighting system equips drawing 4 with the light guide rings 60, 70, 80, and 85, as a broken line shows. The light guide rings 60, 70, 80, and 85 really fabricate predetermined transparent materials, such as transparence acrylic resin, the shape of abbreviation horse's hoofs, and in the shape of radii, are formed, and are arranged corresponding to the tachometer section 20, the speedometer section 30, a fuel gage 40, and a water thermometer 45, respectively. That is, the light guide rings 60, 70, 80, and 85 are formed so that it may become a minor diameter from the openings 52, 53, 54, and 55 to which the bore corresponds a little. And as it is arranged and fixed along the openings 52 and 53 of the mask section 51, and a 54 or 55-round edge and is shown in drawing 1, the inner skin exposes the light guide rings 60, 70, 80, and 85 to the method of the inside of some from openings 52, 53, 54, and 55.

[0038] As shown in drawing 4, the both ends of the light guide ring 60 for tachometer section 20 and the light guide ring 70 for speedometer section 30 are equipped with the LED case 90, respectively. Moreover, one edge (upper limit section) of the light guide ring 80 for fuel gage 40 and the light guide ring 85 for water thermometer 45 is equipped with the LED case 90, respectively. The LED case 90 is formed in square tubed [ which carries out opening of the vertical both ends from a resin ingredient ]. Adhesion maintenance of the LED case 90 is carried out at each edge of the light guide rings 60, 70, 80, and 85 by inserting the LED case 90 in each edge of the light guide rings 60, 70, 80, and 85 from a lower part.

[0039] LED (illustration abbreviation) as the light source is held in the lower limit section within said LED case 90, and the both ends of the light guide rings 60, 70, 80, and 85 are equipped with LED through the LED case 90. Each LED is mounted in the flexible printed circuit board 100,105 mentioned later.

[0040] Next, gestalt 1 of operation of this invention The configuration of the guide lighting system of the meter for cars to cost is explained. Drawing 5 is X-X-ray sectional view of drawing 4, and shows the attachment condition of the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention. Drawing 6 R> 6 is the important section expanded sectional view of drawing 5.

[0041] The guide lighting system of the gestalt of this operation introduces light into guides 22, 32, and 42 and the 47 interior from the end face of revolving-shaft 32a which fixed in one to the shanks 22b, 32b, 42b, and 47b of the guides 22, 32, 42, and 47 of each meter sections 20, 30, 40, and 45, as shown in drawing 5 and drawing 6. Guides 22, 32, and 42 and the 47 whole are illuminated (only in the case of the speedometer section 30, it illustrates). First, a guide 32 will be equipped with 32d of guide sections really fabricated so that it might extend in the driving shaft for guide rotation (illustration abbreviation) in the radiation direction of revolving-shaft 32a by which actuation connection is carried out, shank 32b

of the shape of a cylinder which really fixes pivotable at revolving-shaft 32a, and shank 32b if the configuration of guide 32 the very thing is explained. Said shank 32b and 32d of guide sections are really fabricated from predetermined transparent materials, such as transparence acrylic resin. Moreover, reflector 32c which inclines in a rear-face side (dial-face 31 side) from a front-face side (shield 53A side) toward 32d of guide sections is formed in the interior of shank 32b. Furthermore, reflector 32e which consists of a white coating layer, an aluminum vacuum evaporatio layer, etc. is formed in the whole rear face of guide section 32a.

[0042] And if incidence of the light is carried out from the front face of shank 32b, the incident light will reflect by reflector 32c, will carry out incidence into 32d of guide sections, and will advance the inside of 32d of guide sections in the die-length direction. Moreover, it reflects by reflector 32e and the light which advanced the inside of 32d of guide sections is ahead emitted from the front face of 32d of guide sections. Thus, a guide 32 is illuminated.

[0043] The guide lighting system of the gestalt of this operation is equipped with the flexible printed circuit boards 100 and 105 of a pair, the LED subassembly 110 for tachometer section 20, the LED subassembly 120 for speedometer section 30, the LED subassembly 130 for fuel gage 40, and the LED subassembly 135 for water thermometer 45. As shown in drawing 4, said LED subassembly 110 is arranged in the rear face of shield 52A of the tachometer section 20 so that it may counter with shank 22b of a guide 22. The LED subassembly 120 is arranged in the rear face of shield 53A of the speedometer section 30 so that it may counter with shank 32b of a guide 32. The LED subassembly 130 is arranged in the rear face of shield 54A of a fuel gage 40 so that it may counter with shank 42b of a guide 42. The LED subassembly 135 is arranged in the rear face of shield 55A of a water thermometer 45 so that it may counter with shank 47b of a guide 47.

[0044] Said flexible printed circuit board 100 has the short band-like terminal area 101 and a connection 102. the leg prolonged, respectively in each LED subassembly 120,130,135 which arranged the connection 102 in the speedometer section 30, the fuel gage 40, and the water thermometer 45, and each LED case 90 of the light guide rings 70, 80, and 85 -- the shape of a polymelia sheet which has a part is made. Moreover, the flexible printed circuit board 105 has the short band-like terminal area 106 and a connection 107. the leg prolonged, respectively in the LED subassembly 110 which arranged the connection 107 in the tachometer section 20, and the LED case 90 of the light guide ring 60 -- the shape of a polymelia sheet which has a part is made.

[0045] Each flexible printed circuit board 100,105 is arranged in the mask section 51 and rear-face side of Shields 52A, 53A, 54A, and 55A, is covered, and is checked by looking from a transverse plane (operator side). Moreover, each flexible printed circuit board 100,105 is arranged in the rear face of the mask section 51 and Shields 52A, 53A, 54A, and 55A, and the space between dial faces 21, 31, 41, and 46, and contacts and interferes in dial faces 21, 31, 41, and 46.

[0046] Next, the attachment mode and its configuration to shield 53A of the LED subassembly 120 are explained in full detail. Drawing 7

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

[Drawing 1] Drawing 1 is the front view showing the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[Drawing 2] Drawing 2 is the front view showing the reward plate of the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[Drawing 3] Drawing 3 is the side elevation showing the reward plate of the meter for automobiles which applied the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[Drawing 4] Drawing 4 is the rear view showing the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention with the structure by the side of the tooth back of the reward plate of the meter for automobiles.

[Drawing 5] Drawing 5 is X-X-ray sectional view of drawing 4, and shows the attachment condition of the guide lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[Drawing 6] Drawing 6 is the important section expanded sectional view of drawing 5.

[Drawing 7] Drawing 7 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[Drawing 8] Drawing 8 is the top view showing the LED subassembly for the tachometer sections of the lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[Drawing 9] Drawing 9 is the top view showing the LED subassembly for fuel gages of the lighting system of the meter for cars concerning the gestalt 1 of operation of this invention.

[Drawing 10] Drawing 10 is the rear view showing the guide lighting system of the meter for cars concerning the gestalt 2 of operation of this invention.

[Drawing 11] Drawing 11 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 2 of operation of this invention.

[Drawing 12] Drawing 12 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 3 of operation of this invention.

[Drawing 13] Drawing 13 is the top view showing the LED subassembly for the speedometer sections of the lighting system of the meter for cars concerning the gestalt 4 of operation of this invention.

[Drawing 14] Drawing 14 is the top view showing the LED subassembly for the tachometer sections of the lighting system of the meter for cars concerning the gestalt 5 of operation of this invention.

[Drawing 15] Drawing 15 is the top view showing the LED subassembly for the tachometer sections of the lighting system of the meter for cars concerning the gestalt 6 of operation of this invention.

[Drawing 16] Drawing 16 is the top view showing the LED subassembly for fuel gages of the lighting system of the meter for cars concerning the gestalt 7 of operation of this invention.

**[Description of Notations]**

22, 32, 42, 47: guide, 32a: Revolving shaft

112, 122, 132, 137: LED unit



212,242,247: LED unit  
302, a 312,322,332,342:LED unit  
114R,114B,114G:LED  
124R,124B,124G:LED  
134R,134B,134G:LED  
214R,214B,214G:LED  
304R,304B,304G:LED  
314R,314B,314G:LED  
324R,324B,324G:LED  
334R,334B,334G:LED  
344R,344B,344G:LED

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[Translation done.]

## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

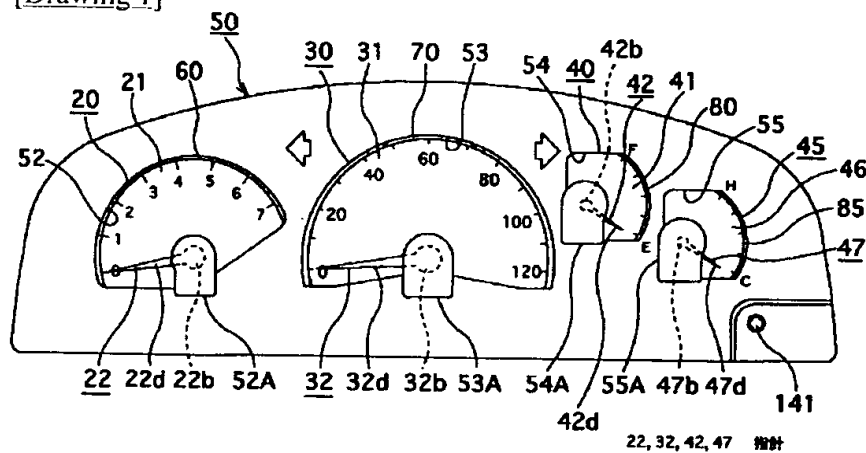
1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. \*\*\*\* shows the word which can not be translated.

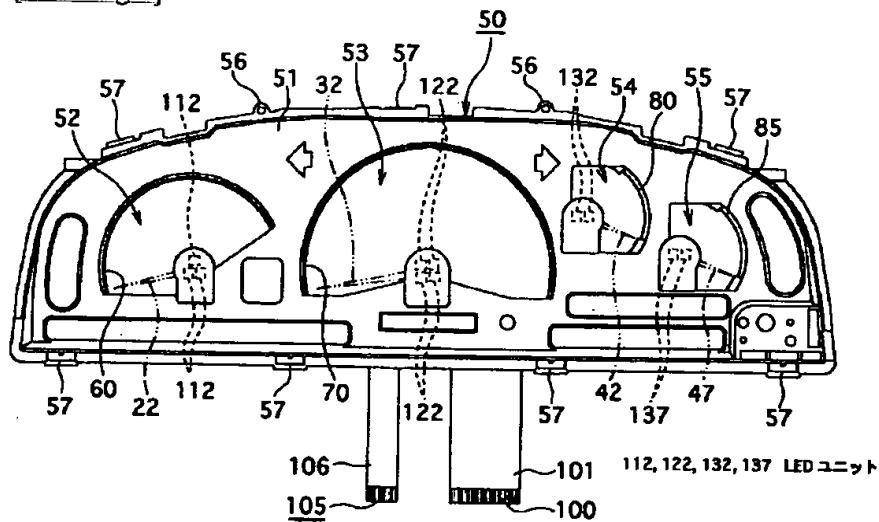
3. In the drawings, any words are not translated.

## DRAWINGS

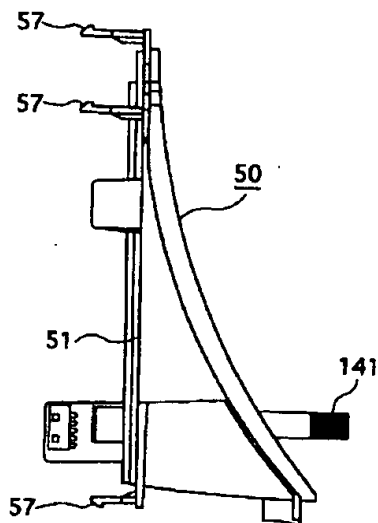
[Drawing 1]



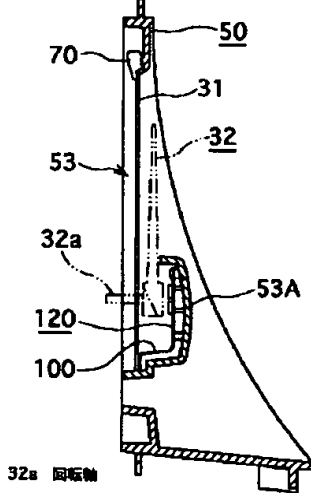
[Drawing 2]



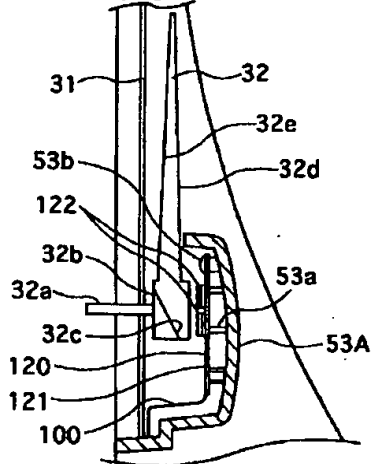
[Drawing 3]



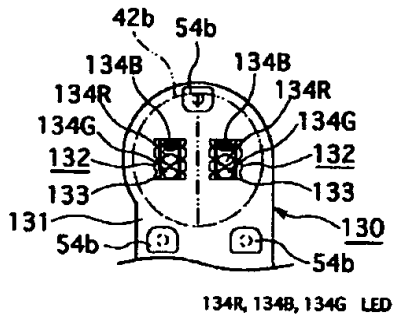
[Drawing 5]



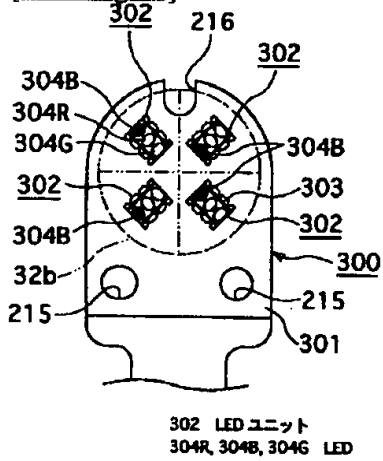
[Drawing 6]



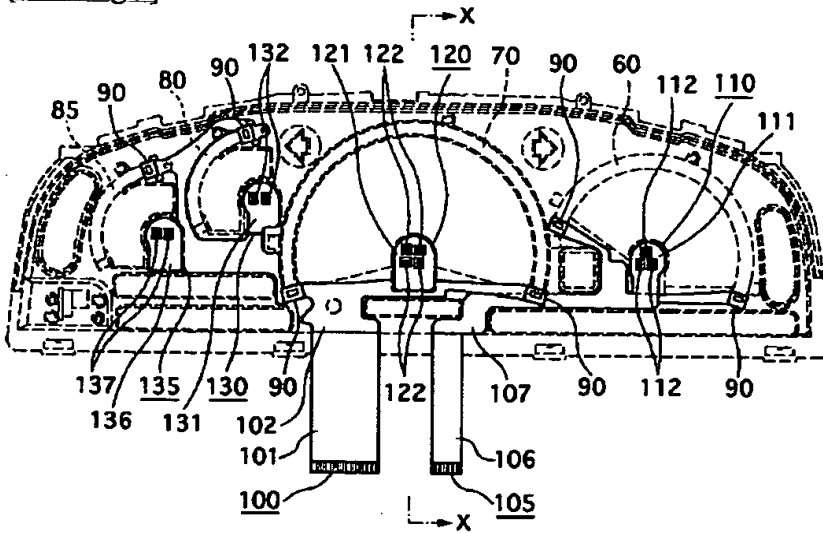
[Drawing 9]



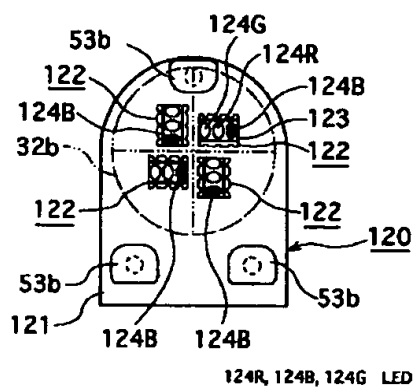
[Drawing 12]



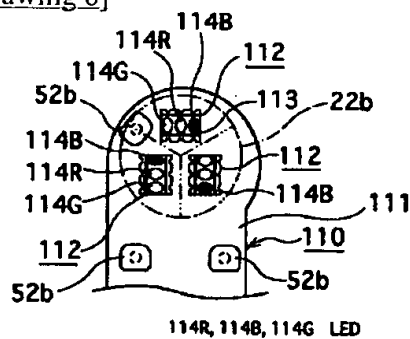
[Drawing 4]



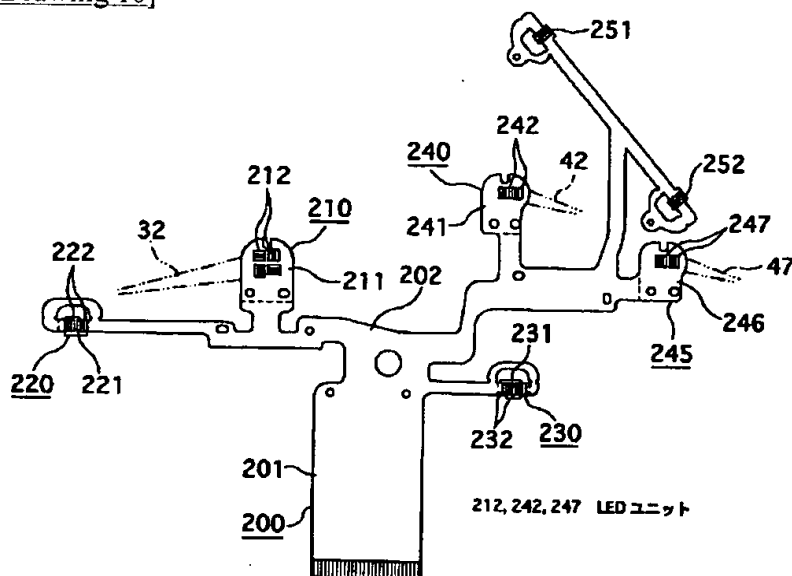
[Drawing 7]



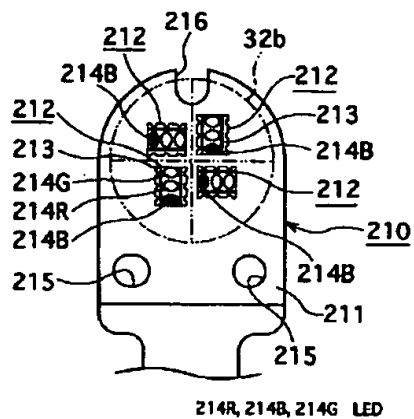
[Drawing 8]



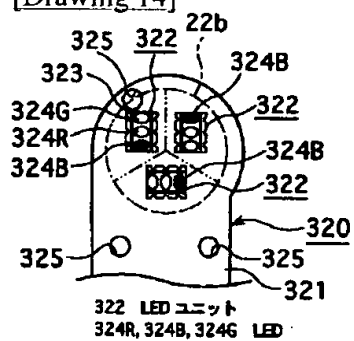
[Drawing 10]



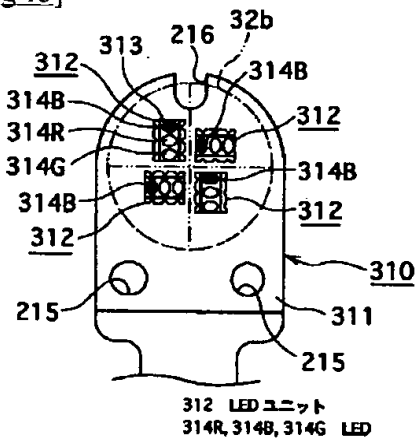
[Drawing 11]



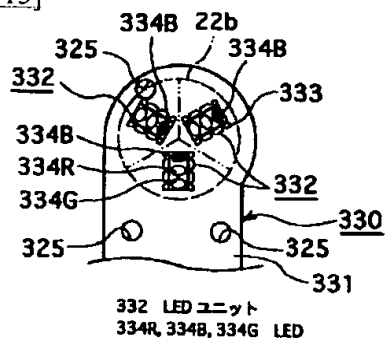
[Drawing 14]



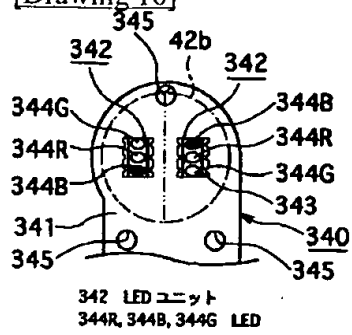
[Drawing 13]



[Drawing 15]



[Drawing 16]



[Translation done.]